CARIBOO FOREST REGION

RESOURCE MANAGEMENT PLAN

2002/2003

ENHANCING ENVIRONMENTAL VALUES

September 15, 2001

106-01538/

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ENHANCING ENVIRONMENTAL VALUES COMPONENT

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1. Regional Summary of Enhancing Environmental Values Issues and Priorities

The main issue and priority for the Enhancing Environmental Values (EEV) strategic objective in the Cariboo Region is the Watershed Restoration Program (WRP). The vision of WRP is to speed the recovery of fish habitat and water quality in priority key watersheds across the province that have been damaged or which are seriously threatened by past forest development activities. Twenty percent of the Key Watersheds in the Cariboo Region are targeted to have restoration work completed over a five year period. Table 3a shows the Highest Future Priorities that should be addressed, across the region, as restoration is completed in other watersheds.

The goals of WRP are to:

- Restore and protect fish habitat and water quality in priority key watersheds adversely affected by forest harvesting practices that, without intervention, would require decades to recover naturally.
- Provide better knowledge, information and tools to strengthen sustainable management of watersheds.
- Provide community-based employment, training and stewardship opportunities.

1.1. Criteria

Guidelines were provided as a benchmark to achieve objectives for developing the EEV strategic objective for the 2002/2003 Resource Management Plan. The process to develop key products to achieve these objectives is as follows:

- **Identify Key Buckets**
  A regional list (and GIS-based map) of high-priority watersheds was developed by MINISTRY OF WATER, LAND & AIR PROTECTION (WLAP) using watershed sub-basins called 'buckets' developed for the Cariboo Forest Region. These buckets were ranked according to WLAP's criteria for high fish value and domestic water supply. In conjunction with this process, the Department of Fisheries and Oceans (DFO) ranked its high priority buckets to form a key bucket list.

- **Review and Rank the Bucket List**
  the list was reviewed by Ministry of Forests (MOF) district staff and ranked and included district priorities. Ranking included forestry-related current issues within district buckets that continue to impact fisheries and domestic water supply values.

- **Aggregate Ranking**
  Ranking information collected from each process was then incorporated into a multi-agency ranking for each of the key buckets.

- **Consultation**
  The multi-agency ranking list was then discussed with licensee stakeholders from the three TSAs within the Cariboo Forest Region—Williams Lake, Quesnel and 100 Mile House.

From this consultation, 20% of the key buckets were selected as satisfying FRBC 2002/2003 funding objectives.

1.2. Regional List of Criteria Used to Derive the Relative Ranking of Watersheds and Determine Key Watersheds

The scoring and ranking of the bucket watersheds was not revisited in 2001. Proponents accepted and invested in the identified watersheds without conflict last year and this process was left as is for the 2002/2003 RMP. For reference, the criteria are as follows.

1.2.1. Target Fish Species

Concerns have been raised in the Cariboo Forest Region for a number of fish species and stocks. After a review of the database and from local knowledge, WLAP and DFO have identified the target fish species and stocks depending on (a) threatened status, (b) uniqueness, and (c) fish species/stocks below conservation level.

The following is a list of identified fish species/stocks of concern for the region and rationale for their selection. One or more of these target species may be present within the key buckets identified within this RMP.

- **Rainbow trout** (RB): Surveys have shown that 70% of all fish caught by anglers in the Cariboo Forest Region were rainbow trout. This species contributes significantly to the economy of the region. Rainbow trout are stream spawning and rearing obligatory and, as such, are sensitive to stream disturbances caused by land development. Many of the rainbow trout populations are isolated stocks with restricted ranges and locally adapted traits.

- **Bull trout** (BT), (Dolly Varden Char): The BC Conservation Data Centre has blue-listed bull trout as sensitive due to its global decline in distribution and abundance. Bull trout are stream spawning and rearing obligatory and have very specific stream requirements. These requirements include cool temperatures, unobstructed stream migration routes and stable stream substrate with good cover. Bull trout appear to be very sensitive to stream disturbances caused by land development.

- **Chiselmouth** (CMC) and **Brassy Minnow** (BMC): The BC Conservation Data Centre considers chiselmouth and brassy minnow as blue-listed species due to their limited distribution in BC. The two species' habitat requirements are poorly documented, and therefore, a precautionary approach is required. Restoring pre-harvesting stream conditions is desired.

- **Salmon** (Chinook, Coho and Sockeye): DFO to date have identified a high priority on Chinook as the target species, although it is know that special management considerations are in place for Coho and Sockeye as well. All three species are present in most of the region. Some additional work in the future may need to be completed to address these species as target fish species in the Cariboo region.

1.2.2. Bucket Base Map for the Cariboo Forest Region

Buckets are used as land area units for restoration in the Cariboo-Chilcotin region instead of complete watersheds or sub-basins. The bucket map would also be used as the regional base map for watershed restoration prioritization. Of 398 buckets in the Cariboo Forest Region, 133 key buckets were identified and ranked across the region. Key buckets were identified on the basis of selected target fish species and presence of domestic water supply point of diversion (POD). These target fish-bearing and domestic water supply buckets were ranked on the basis of a qualitative estimation of the degree of impact and cause.

From this point onward, the buckets will be referred by bucket numbers, with cross reference to the drainage name for convenient locating on the base map.

1.2.3. List of Key Buckets

Table 1 provides a list of the identified key buckets for the region. The table shows the drainage, within which the bucket is located, the buckets as identified by bucket number, the types and number of target fish species, and the presence of a domestic water supply point of diversion corresponding to each of the key buckets. Some buckets were included in the list if harvesting activities in those buckets could have impacts on the downstream fish-bearing habitat.

Key buckets for ranking were initially identified by WLAP Fisheries incorporating information from, but not limited to, biological studies and watershed assessments, and satisfying the obligations of the Cariboo-Chilcotin Land Use Plan.

Table 1. Buckets containing target fish species and water supply point of diversion

P indicates presence
(P) indicates likelihood of presence, but further inventory required.

			Fish species present					
Forest District	**Drainage Name**	**Bucket #**	**Rainbow Trout**	**Bull Trout**	**Chisel-mouth**	**Brassy Minnow**	**Chinook**	**POD**
Quesnel	John Boyd	493	P	P			P	P
	Lightning	494	P	P			P	P
	Lower Nazko	381	P		P		P	P
	Willow	103	P	P			(P)	P
	Antler	100	P	P			(P)	P
	Fontaine	488	P	(P)				P
	Clisbako	391	P				(P)	P
	Cunningham	486	P	P			(P)	
	Swift River	483	P	P			P	
	Little Swift	490	P	P				
	Narcosli	291	P				P	P
	Victoria Creek	478	P	P				
	Sovereign	491	P	P				
	Umiti	496	P					
	Mid Nazko	381a	P		P		P	
	Big Valley	106	P	P			(P)	
	Lower Bowron	104	P	P			(P)	P
	Matthew	489	P	P				
	Fraser	283	P	P			P	P
		283a	P	P			P	P

Table 1. (Continued)

Forest District	Drainage Name	Bucket #	Fish species present					
			Rainbow Trout	Bull Trout	Chisel-mouth	Brassy Minnow	Chinook	POD
Quesnel	Ramsay Ck	293	P					
(cont.)	Wentworth	392	P					
	Merston	296	P					P
	Bazaeko	401	P	P			(P)	
		409	P	P			P	
		420	P	P			P	
	Tregallis	102	P	P				
	Ketchum	109	P	P			(P)	
	Kimball	487	P	P				
	Mcfarlane	398	P					
	Snaking	407	P					
	Bazaeko	394	P	P				
		399	P				P	
		402	P					
	Coglistiko	414	P					
	Summit	105	P	P				
	Udy	413	P					
	Webster	289	P					
	Twan	286	P					
	Unnamed	295	P					
		298	P					
Williams	Williams Lake	265a	P					P
Lake	Lower Big Creek	142a	P	(P)			(P)	P
	Lower Churn	243a	P	P			(P)	P
	McLeese Lake	290	P					P
	Hawks Creek	284	P				(P)	P
	Fredy/Beedy	462	P					P
	Chimney	271	P					P
	Mons Creek/Lake	165	P					P
	Cooper Creek	158	P					P
	150 Mile	280	P					P
	Rose Lake	285	P					P
	Upper Churn	243	P	P				
	Hungry Valley	142	P					
Horsefly	McKinley	445	P			P	(P)	P
	Wolverine	472a	P					P
	North Arm	464c	P	P				P
	Woodjam	451	P					P
	Horsefly Mainstem	453	P			P	P	P
	Keithley	480	P	P				P
	Mid Quesnel River	464a	P	P			P	P
	Likely	464b	P				P	P
	Moffat	448	P				P	P
	Cariboo Lake	472	P	P			P	P
	Little River	479	P	P			P	
	Bill Miner	464	P	P				
	Rollie	477	P					
	Roaring River	473	P	P				
	McKusky	450	P					
	Spanish	468	P	P				

Table 1. (Continued)

Forest District	Drainage Name	Bucket #	Fish species present					
			Rainbow Trout	Bull Trout	Chisel-mouth	Brassy Minnow	Chinook	POD
Horsefly	Sellers	470	P	P				
(cont.)	Polley	463	P					
	Molybdenite	447	P					
	Wasko	467	P					
	Grain Creek	469	P					
	Upper Horsefly	455	P					
	Hen Ingram	465	P					P
	Tisdale	452	P					
	Watt Creek	475	P					
	Beaver Valley	456a	P				(P)	P
	Cameron	485						
100 Mile House	Bonaparte River	77	P				P	P
	Young Lake	77a	P				P	P
	Fifty-seven Creek	86	P				P	P
	Chasm	87	P					P
	Fifty-nine Creek	90	P					P
	Scott Creek	91	P					P
	Rayfield River	93	P					P
	Eagan Lake	96	P					P
	Cutoff Valley Creek	82	P					P
	Clinton	84	P					P
	Loon Lake	81	P					P
	Brown Creek	95	P					
	Murphy Lake	371	P					P
	Bridge	357a	P					P
	Bridge	357b	P					P
	San Jose	273	P					P
	Jim	360	P					P
	Gorge Cr/Deadman	78	P					P
	Hamilton/Deadman	85	P					P
	Lang Lake	371a	P					P
	Watch Lake	99	P					P
	Bridge/Canim	357	P					P
	Bradley	368	P					P
	Peach Creek	374	P					P
	Coffee	378	P					
	Boss	372	P					
	Hendrix	375	P					
	Deception	373	P					
	Spanish	377	P					
	Joe Ross Cr/Deadman	88	P					
	Green Lake	94	P					P
	No name (?) Creek	376	P					
	McKinley	445	P			P	(P)	P

Table 1. (Continued)

Forest District	Drainage Name	Bucket #	Fish species present					
			Rainbow Trout	Bull Trout	Chisel-mouth	Brassy Minnow	Chinook	POD
Chilcotin	Chilcotin Lake	124b	P	(P)	(P)		(P)	P
	Hanceville	180	P	P			P	P
	Chilcotin	119	P	P			P	P
	Alexis Creek	190	P	P			P	P
	Upper Chilcotin	124	P	P			P	
	Haines Creek	171	P					P
	Anaham Creek	185	P					P
	Alexis Lakes	187	P					P
	Tatlayoko	327	P	P				P
	Homathko	327a	P	P				P
	Clusko	130	P		(P)		(P)	
	Charlotte Lake	70	P					P
	Kappan Lake	74	P					
	Scum Lake	171a	P					
	Zenzaco	184	P					P
	Avon Creek	188	P					P
	Mosley Creek	332a	P	P				
	Punkutlaenkut	131	P	P			(P)	
	S. Anahim Creek	186	P					
	Nimpo Creek	194	P					
	Upper Chilcotin	124a	P	P	(P)			

1.3. Criteria Used to Designate Key Watersheds into Categories I to V

There are now five categories for key watersheds, as described below.

- **Category I:** *Watersheds that have known impacts from pre-Code forestry but are still functional watersheds that will potentially benefit from restoration activities.*

These watersheds are known to have experienced forestry-related habitat impairment or water-quality degradation in a portion of the watershed (at least 15% of the total area), or are believed to have a forestry-related threat to fish habitat or water quality, but still with significant areas of good quality habitat. It is believed that restoration activity can be rapidly focused on improving conditions or preventing damage before it occurs (e.g., roads with high risk of failure). Category I watersheds can also include those portions of a watershed that contain important identified target species and are upstream of agricultural or urbanized areas, or supply water to a community intake that is upstream of other land uses. Where the important habitat areas are affected by other land uses, the watershed is not Category I. This category may include watersheds where restoration activity has previously occurred.

- **Category II:** *Watersheds with impacts from pre-Code forestry as well as other land uses (including private land), for which there is a coordinated restoration plan in place.*

The watershed must still be functional and able to benefit from coordinated restoration activity. Restoration will require a coordinated approach to address all of the land-use impacts. WRP activities in Category II watersheds must be coordinated with other funding sources, such as Fisheries Renewal BC or the Habitat Restoration Salmonid Enhancement Program, to significantly affect fish recovery or water quality improvement. This category may include watersheds where restoration activity has previously occurred.

- **Category IIB:** *Watersheds with significant impacts from other land use, including private land, but where there is no coordinated restoration plan in place.*

Restoration of these watersheds through activity only if the forest land will potentially provide low benefit because of impacts from other land uses such as agriculture, mining or residential development.

- **Category III:** *Watersheds with minimal or no pre-Code forestry-related impairment of fish habitat or water quality.*

In these cases, restoration activity may not be required or may not be cost-effective in relation to a small, incremental improvement in fish habitat or water quality. This category includes watersheds with little or no forest development.

- **Category IV:** *Watersheds known to be impacted to such an extent that restoration effort is unlikely to be successful.*

These watersheds are believed to have experienced such extensive habitat or hillslope damage that expenditures will be so high and restoration time so slow that it is not cost-effective to restore.

- **Category V:** *Watersheds with insufficient data to make a determination*

Watersheds with no assessment surveys are temporarily on hold and are subject areas for overview assessments. They do not become candidate watersheds for restoration activity until more is known about their status, but they are not rejected at this point either.

Information used to place watersheds into these categories is based on assessments completed to date and knowledge of the watershed by industry and/or agency. The preliminary category of each of the designated key watersheds is included in table 4 and a regional summary is found in table 2. A considerable amount of subjectivity was used to categorize these key watersheds, and as increased knowledge of the watershed is brought forward, the category of the watershed may have to change.

Table 2. Regional Watershed Unit Summary By Category

Region: Cariboo	Number of Watershed Units
Key watershed units that are Category I	130
Key watershed units that are Category II	6
Key watershed units that are Category IIB	3
Key watershed units that are Category III	8
Key watershed units that are Category IV	1
Key watershed units that are Category V	25
Number of Key Watershed Units (Sum of key categories 1-V)	173
Total Number of priority key watershed units	101
Total Number of watershed units (including key and non key)	398

2. Summary of Regional Priority Setting

Table 3 lists the buckets by forest district and gives the bucket rankings by WLAP Fisheries and Water Management, DFO and MOF. The multi-agency ranking was determined as the final step. Table 3(a) lists a regional summary of the highest future priority buckets which require work.

Table 3. Cariboo Forest Region Key Buckets

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	WLAP Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Quesnel	John Boyd	493	42,559	H	H	H	H	**H**		CCM02106	West Fraser
	Lightning	494	24,547	H	H	H	H	**H**	Mining	CCM02105	Weldwood
	Lower Nazko	381	42,256	H	H	H	H	**H**			
	Willow	103	54,864	H	H	H	H	**H**		CCM02105	Weldwood
	Willow-Crescent Creek	103								CCM02106	West Fraser
	Antler	100	28,342	H	H	H	H	**H**	Mining		
	Antler-Russian Creek	100								CCM02106	West Fraser
	Fontaine	488	7,106	H	H	H	H	**H**		CCM02106	West Fraser
	Clisbako	391	67,444	H	H	H	H	**H**			
	Cunningham	486	16,639	H	L	H	H	**H**		CCM02105	Weldwood
	Swift River	483	39,957	H	L	H	H	**H**			
	Little Swift	490	12,812	H	L	H	H	**H**		CCM02105	Weldwood
	Narcosli	291	25,312	H	H	H	H	**H**	Agriculture		
	Victoria Creek	478	24,572	H	L	H	H	**H**			
	Sovereign	491	12,449	H	L	H	H	**H**		CCM02106	West Fraser
	Umiti	496	15,256	H	L	H	H	**H**		CCM02106	West Fraser
	Mid Nazko	381a	42,167	H	L	H	H	**H**			
	Big Valley	106	21,655	H	L	H	H	**H**		CCM02106	West Fraser
	Lower Bowron	104	33,572	H	H	H	H	**H**			
	Matthew	489	39,744	H	L	L	H	**H**		CCM02105	Weldwood

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Quesnel	Fraser	283	63,812	L	H	H	H	**H**			
		283a	44,197	L	H	H	H	**H**			
	Ramsay Creek	293	29,206	H	L	H	H	**H**			
	Wentworth	392	15,444	H	L	H	H	**H**			
	Merston	296	27,586	H	H	L	L	**H**			
	Bazaeko	401	42,820	H	L	H	H	**H**			
		409	21,006	H	L	H	H	**H**			
		420	20,508	H	L	H	H	**H**			
	Tregallis	102	9,445	H	L	H	H	**H**	Mining		
	Ketchum	109	12,826	H	L	L	L	**H**		CCM02106	West Fraser
	Kimball	487	6,807	H	L	L	H	**L**		CCM02105	Weldwood
	Mcfarlane	398	11,326	L	L	H	H	**L**			
	Snaking	407	17,633	H	L	L	L	**L**			
	Bazaeko	394	13,917	L	L	H	H	**L**			
		399	9,944	L	L	H	H	**L**			
		402	6,734	L	L	H	H	**L**			
	Coglistiko	414	12,591	L	L	H	H	**L**			
	Summit	105	6,702	H	L	L	H	**L**	Mining		
	Udy	413	22,145	H	L	L	L	**L**	Mining		
	Webster	289	20,261	L	L	L	L	**L**			
	Twan	286	36,635	L	L	L	L	**L**			
	Unnamed	295	6,600	L	L	L	L	**L**			
	Unnamed	298	9,222	L	L	L	L	**L**			
	Antler-Russian Creek	100									
	Willow-Crescent Creek	103									
Williams Lake	Williams Lake	265a	32,367	H	H	H	H	**H**			
	Lower Big Creek	142a	26,406	H	H	L	H	**H**		CCM02203	Riverside
	Lower Churn	243a	30,575	H	H	H	H	**H**			
	McLeese Lake	290	15,580	H	H	L	H	**H**			
	Hawks Creek	284	38,379	L	H	H	H	**H**			

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Williams Lake	Fredy/Beedy	462	26,187	H	H	L	L	**H**		CCM02205	Weldwood
	Chimney	271	44,212	L	H	L	H	**H**			
	Mons Creek/Lake	165	7,999	L	H	L	H	**H**		CCM02203	Riverside
	Cooper Creek	158	10,855	H	H	L	L	**L**			
	150 Mile	280	26,043	L	H	L	L	**L**			
	Rose Lake	285	9,963	L	H	L	L	**L**			
	Upper Churn	243	38,639	H	L	L	L	**L**			
	Hungry Valley	142	24,745	H	L	L	L	**L**			
	Bambrick Creek	161						none			
	Big Creek – Main Stem	142B						none			
	Farwell Creek	170						none			
	Gaspard Creek	168						none			
	Goundhog Creek	155						none			
	Un-Named Creek	166						none			
Horsefly	*McKinley (Note: Also included in 100 Mile House FD)	445	38,898 (total area of bucket)	H	H	H	H	**H**		CCM02205	Weldwood
	Wolverine	472a	19,535	H	H	H	U	**H**			
	North Arm	464c	36,549	H	H	H	H	**H**			
	Woodjam	451	9,302	H	H	H	H	**H**		CCM02205	Weldwood
	Horsefly Main Stem	453	31,890	H	H	H	U	**H**		CCM02203	Riverside
	Keithley	480	15,090	H	H	H	H	**H**		CCM02203	
	Mid Quesnel River	464a	42,083	H	H	H	U	**H**			
	Likely	464b	67,025	H	H	H	U	**H**			
	Moffat	448	44,562	H	H	H	H	**H**		CCM02205	Weldwood
	Cariboo Lake	472	25,868	H	H	L	H	**H**		CCM02204	Lignum
	Little River	479	38,772	H	L	H	H	**H**		CCM02205	Weldwood

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Horsefly	Rollie	477	6,131	H	L	H	H	H		CCM02204	Lignum
	Bill Miner	464	49,105	H	L	H	H	H			
	Roaring River	473	19,598	H	L	H	H	H			
	McKusky	450	32,000	H	L	H	H	H			Riverside
	Cameron	485	35,289	H	L	H	H	H	Park	CCM02205	Weldwood
	Spanish	468	12,904	H	L	L	H	H		CCM02205	Weldwood
	Sellers	470	8,811	H	L	L	H	H		CCM02205	Weldwood
	Polley	463	9,851	H	L	H	U	H		CCM02205	Weldwood
	Molybdenite	447	8,222	H	L	H	H	H		CCM02205	Weldwood
	Wasko	467	11,350	H	L	H	L	H			
	Grain Creek	469	11,378	H	L	H	H	H		CCM02205	Weldwood
	Upper Horsefly	455	46,384	L	L	H	H	H		CCM02203	Riverside
	Hen Ingram	465	9,131	H	H	L	L	H			
	Tisdale	452	7,030	H	L	L	L	L			
	Watt Creek	475	9,984	L	L	H	H	L			
	Beaver Valley	456a	41,538	H	H	L	U	H			
100 Mile House	Bonaparte River	77	35,717	H	H	H	H	H	Agriculture	CCM02305 CCM02303	Weldwood West Fr.
	Young Lake	77a	40,051	H	H	H	H	H		CCM02305 CCM02303	Weldwood West Fraser
	Fifty-seven Creek	86	12,820	H	H	H	H	H			
	Chasm	87	14,903	H	H	H	H	H			
	Fifty-nine Creek	90	10,952	H	H	H	H	H			
	Scott Creek	91	6,261	H	H	H	H	H			
	Rayfield River	93	41,754	H	H	H	H	H			
	Eagan Lake	96	17,264	H	H	H	H	H			
(Community	Cutoff Valley Creek	82	11,922	H	H	H	H	H			
Watersheds)	Clinton	84	14,057	H	H	H	H	H			
	Loon Lake	81	37,580	H	H	L	H	H			
	Brown Creek	95	6,445	H	L	H	H	H			
	Murphy Lake	371	31,490	H	H	L	H	H			

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
100 Mile House	Bridge	357a	21,753	H	H	L	H	H		CCM02303	West Fraser
	Bridge	357b	51,017	H	H	L	H	H			
	San Jose	273	12,903	H	H	L	H	H	Agriculture	CCM02305 CCM02303	Weldwood West Fraser
	Jim	360	39,828	H	H	L	H	H		CCM02305 CCM02303	Weldwood West Fr.
	Gorge Creek/Deadman	78	4,151	H	H	L	H	H			
	Hamilton/ Deadman	85	11,419	H	H	L	H	H			
	Lang Lake	371a	27,977	H	H	L	H	H			
	Watch Lake	99	7,834	L	H	L	H	H			
	Lower Bridge/Canim	357	45,152	L	H	L	H	H			
	Bradley	368	23,268	L	H	L	H	H			
	Peach Creek	374	9,443	L	H	L	H	H			
	Coffee	378	11,432	H	L	L	H	H		CCM02305	Weldwood
	Boss	372	13,889	H	L	L	H	H		CCM02305	Weldwood
	Hendrix	375	15,978	H	L	L	H	H		CCM02305	Weldwood
	Deception	373	32,240	H	L	L	H	H		CCM02305	Weldwood
	Spanish	377	14,876	H	L	L	H	H		CCM02305	Weldwood
	*McKinley (Note: Also included in Horsefly FD)	445	38,898 (total area)	H	H	H	H	H			Weldwood
	Joe Ross Cr/Deadman	88	9,548	H	L	L	H	L			
	Green Lake	94	24,916	L	H	L	L	L			
	No name (?) Creek	376	6,083	L	L	L	H	L		CCM02305	Weldwood
Chilcotin	Chilcotin Lake	124b	30,366	H	H	H	H	H			
	Hanceville	180	26,256	H	H	H	U	H			
	Chilcotin	119	27,669	H	H	H	L	H			

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Chilcotin	Alexis Creek	190	31,215	H	H	L	H	H			
	Upper Chilcotin	124	27,252	H	L	H	H	H			
	Haines Creek	171	43,951	L	H	L	H	H			
	Anaham Creek	185	46,058	L	H	L	H	H		CCM02204 CCM02203	Lignum Riverside
	Alexis Lakes	187	30,443	L	H	L	H	H		CCM02204 CCM02203	Lignum Riverside
	Tatlayoko	327	49,023	H	H	L	H	H		CCM02203	Riverside
	Tatlayoko	327a	25,477	H	H	L	H	H		CCM02203	Riverside
	Clusko	130	45,815	H	L	L	H	L			
	Charlotte Lake	70	39,374	L	H	L	L	L			
	Kappan Lake	74	16,911	L	L	L	H	L			
	Scum Lake	171a	18,243	L	L	L	H	L			
	Zenzaco	184	11,965	L	H	L	H	L			
	Avon Creek	188	16,039	L	H	L	H	L			
	Mosley Creek	332a	43,570	H	L	L	L	L		CCM02203	Riverside
	Punkutlaenkut	131	32,943	L	L	H	L	L			
	S. Anahim Creek	186	11,830	L	L	L	H	L			
	Nimpo Creek	194	12,616	L	L	L	L	L			
	Upper Chilcotin	124a	41,653	L	L	L	L	L			
	Moore Creek	132						none			
	Un-named	129						none			
	Upper Bidwell	183						none			
	McDermottt	169						none			
	Bidwell Creek	179						none			
	Maxwell Creek	389						none			
	Aneko Creek	388						none			
	Palmer Lake	382						none			
		383						none			
		381b						none			
		386						none			
		381a						none			
		385						none			

Table 3. (Continued)

MOF District	Drainage Name	Bucket No.	Area (ha)	WLAP Fisheries Ranking	MSRM Water Mgmt. Ranking	DFO Ranking	MOF Ranking	Multi-Agency Ranking/ Priority Key Watershed for Region	Category II Issues	MYA # For Units With Active Projects	Implem. Partner
Chilcotin		384						none			
	Clearwater	353						none			
		189						none			
		323						none			
		332						none			
		336						none			
	Miner Lake	347						none			
	Miner Lake	348						none			
	One Eye	351						none			
	Kappan	73						none			
	Hotnarko	76						none			
	Nimpo	191b						none			
	Holtry	193						none			
	Smokey	348a						none			
	Anahim	195						none			

Table 3a. Highest Future Priorities

Forest District	MOF Identified Priorities	WLAP Identified Priorities
Quesnel	493 – John Boyd 494 – Lightning 103 – Willow 106 – Big Valley 100 – Antler	494 – Lightning
Williams Lake	265a – Williams Lake 142a – Lower Big Creek 158 – Cooper Creek 290 – McLeese Lake 284 – Hawks Creek	
Horsefly	470 – Seller 472 – Cariboo Lake 485 – Cameron 445 – McKinley *	472 – Cariboo Lake 445 – McKinley *
100 Mile House	445 – McKinley * 360 – Jim / Windy 93 – Rayfield River 96 – Eagan Lake 81 - Loon Lake	360 – Jim / Windy 84 - Clinton 357b – Bridge
Chilcotin	180 – Hanceville	185 – Anaham Creek 187 – Alexis Lakes

* Included in Horsefly and 100 Mile House Forest Districts

Watershed Status Report

Table 3b. All Watershed Units

MOF District	Bucket Name	Bucket Number	Are there significant pre-Code forestry impacts to fish habitat or water quality?	Is it likely that restoration efforts will be successful?	Recipient	MYA Number	Partners
Quesnel	John Boyd	493	Yes	Yes	West Fraser	CCM02106	
	Lightning	494	Unknown	Unknown	Weldwood	CCM02105	
	Lower Nazko	381	Unknown				
	Willow	103	yes	Yes	Weldwood	CCM02106	
	Willow – Crescent Creek	103	Yes	Yes	West Fraser	CCM02106	
	Antler	100	Unknown				
	Antler – Russian Creek	100	Yes	Yes	West Fraser	CCM02106	
	Fontaine	488	Yes	Yes	West Fraser	CCM02106	
	Clisbako	391	Unknown				
	Cunningham	486	Yes	Yes	Weldwood	CCM02106	
	Swift River	483	Unknown				
	Little Swift	490	Yes	Yes	Weldwood	CCM02106	
	Narcosli	291	Unknown				
	Victoria Creek	478	No				
	Sovereign	491	Yes	Yes	West Fraser	CCM02106	
	Umiti	496	Yes	Yes	West Fraser	CCM02106	
	Mid Nazko	381a	Unknown				
	Big Valley	106	Yes	Yes	West Fraser	CCM02106	
	Lower Bowron	104	Unknown				
	Matthew	489	Yes	Yes	Weldwood	CCM02106	
	Fraser	283	yes				
		283a	Unknown				
	Ramsay Creek	293	Unknown				
	Wentworth	392	Unknown				
	Merston	296	Unknown				
	Bazaeko	401	Unknown				
		409	Unknown				
		420	Unknown				
	Tregallis	102	Unknown				
	Ketchum	109	Yes	Yes	West Fraser	CCM02106	

Table 3b (Continued)

MOF District	Bucket Name	Bucket Number	Are there significant pre-Code forestry impacts to fish habitat or water quality?	Is it likely that restoration efforts will be successful?	Recipient	MYA Number	Partners
Quesnel	Kimball	487	Unknown	Yes	Weldwood	CCM02106	
	Mcfarlane	398	Unknown				
	Snaking	407	Unknown				
	Bazaeko	394	Unknown				
		399	Unknown				
		402	Unknown				
	Coglistiko	414	Unknown				
	Summit	105	Unknown				
	Udy	413	Unknown				
	Webster	289	Unknown				
	Twan	286	Unknown				
	Unnamed	295	Unknown				
		298	Unknown				
Williams Lake	Williams Lake	265a	Unknown				
	Lower Big Creek	142a	Unknown		Riverside	CCM02203	
	Lower Churn	243a	Unknown				
	McLeese Lake	290	Unknown				
	Hawks Creek	284	Unknown				
	Fredy/Beedy	462	Yes	Yes	Weldwood	CCM02205	
	Chimney	271	Unknown				
	Mons Creek/Lake	165	Unknown		Riverside	CCM02203	
	Cooper Creek	158	Unknown				
	150 Mile	280	Unknown				
	Rose Lake	285	Unknown				
	Upper Churn	243	Unknown				
	Hungry Valley	142	Unknown				
	Bambrick Creek	161	Unknown				
	Unnamed Creek	166	Unknown				
	Big Creek Mainstem	142b	Unknown				
	Groundhog Creek	155	Unknown				
	Gaspard Creek	168	Unknown				
	Farwell Creek	170	Unknown				

Table 3b (Continued)

MOF District	Bucket Name	Bucket Number	Are there significant pre-Code forestry impacts to fish habitat or water quality?	Is it likely that restoration efforts will be successful?	Recipient	MYA Number	Partners
Horsefly	*McKinley (Note: Also included in 100 Mile House FD)	445	Yes	Yes	Weldwood	CCM02205	
	Wolverine	472a	Unknown	Yes			
	North Arm	464c	Yes	Yes			
	Woodjam	451	Yes	Yes	Weldwood	CCM02205	
	Horsefly Mainstem	453	Yes	Yes	Riverside	CCM02203	
	Keithley	480	Yes	No		CCM02203	
	Mid Quesnel River	464a	Unknown	Unknown			
	Likely	464b	Unknown	Unknown			
	Moffat	448	Yes	Yes	Weldwood	CCM02205	
	Cariboo Lake	472	Yes	Yes	Lignum	CCM02204	
	Little River	479	Yes	Yes	Weldwood	CCM02205	
	Bill Miner	464	Yes	Yes			
	Rollie	477	Yes	Yes	Lignum	CCM02204	
	Roaring River	473	Yes	Yes	West Fraser	CCM02206	
	McKusky	450	Yes	Yes	Riverside		
	Cameron	485	Yes	Yes	Weldwood	CCM02205	
	Spanish	468	Yes	Yes	Weldwood	CCM02205	
	Sellers	470	Yes	Yes	Weldwood	CCM02205	
	Polley	463	Unknown	Unknown	West Fraser	CCM02206	
	Molybdenite	447	Yes	Yes	Weldwood	CCM02205	
	Wasko	467	Yes	Yes			
	Grain Creek	469	Yes	Unknown	Weldwood	CCM02205	
	Upper Horsefly	455	Yes	Yes	Riverside	CCM02203	
	Hen Ingram	465	No	N/A	West Fraser	CCM02206	
	Tisdale	452	Yes	Yes			
	Watt Creek	475	Yes	Yes			
	Beaver Valley	456a	Yes	Yes	WLAP		
100 Mile House	Bonaparte River	77	Yes	Yes	Weldwood/ West Fraser	CCM02305/ CCM02303	
	Young Lake	77a	Yes	Yes	Weldwood/ West Fraser	CCM02305/ CCM02303	
	Fiftyseven Creek	86	Yes	Yes			
	Chasm	87	Yes	Yes			

Table 3b (Continued)

MOF District	Bucket Name	Bucket Number	Are there significant pre-Code forestry impacts to fish habitat or water quality?	Is it likely that restoration efforts will be successful?	Recipient	MYA Number	Partners
100 Mile House	Fiftynine Creek	90	Yes	Yes			
	Scott Creek	91	Yes	Yes			
	Rayfield River	93	Yes	Yes			
	Eagan Lake	96	Yes	Yes			
(community	Cutoff Valley Creek	82	No	N/A			
watersheds)	Clinton	84	No	N/A			
	Loon Lake	81	Yes	Yes			
	Brown Creek	95	Yes	Yes			
	Murphy Lake	371	Yes	Yes			
	Bridge	357a	Yes	Yes	West Fraser	CCM02303	
	Bridge	357b	Yes	Yes	West Fraser	CCM02303	
	San Jose	273	Yes	Yes	Weldwood/ West Fraser	CCM02305/ CCM02303	
	Jim	360	Yes	Yes	Weldwood/ West Fraser	CCM02305/ CCM02303	
	Gorge Creek/Deadman	78	Yes	Yes			
	Hamilton/Deadman	85	Yes	Yes			
	Lang Lake	371a	Yes	Yes			
	Watch Lake	99	Yes	Yes			
	Lower Bridge/Canim	357	Yes	Yes			
	Bradley	368	Yes	Yes			
	Peach Creek	374	Yes	Yes			
	Coffee	378	Yes	Yes	Weldwood	CCM02305	
	Boss	372	Yes	Yes	Weldwood	CCM02305	
	Hendrix	375	Yes	Yes	Weldwood	CCM02305	
	Deception	373	Yes	Yes	Weldwood	CCM02305	
	Spanish	377	Yes	Yes	Weldwood	CCM02305	
	*McKinley (Note: Also included in Horsefly FD)	445	Yes	Yes	Weldwood	CCM02305	
	Joe Ross Cr/Deadman	88	Yes	Yes			
	Green Lake	94	No	N/A			
	No name (?) Creek	376	No	N/A	Weldwood	CCM02305	

Table 3b (Continued)

MOF District	Bucket Name	Bucket Number	Are there significant pre-Code forestry impacts to fish habitat or water quality?	Is it likely that restoration efforts will be successful?	Recipient	MYA Number	Partners
Chilcotin	Chilcotin Lake	124b	Yes				
	Hanceville	180	Yes				
	Chilcotin	119	Yes				
	Alexis Creek	190	Yes				
	Upper Chilcotin	124	Yes				
	Haines Creek	171	Yes				
	Anaham Creek	185	Yes		Lignum and Riverside	CCM02204/ CCM02203	
	Alexis Lakes	187	Yes		Lignum and Riverside	CCM02204/ CCM02203	
	Tatlayoko	327	Yes		Riverside	CCM02203	
	Tatlayoko	327a	Yes		Riverside	CCM02203	
	Clusko	130	Yes				
	Charlotte Lake	70	Yes				
	Kappan Lake	74	Yes				
	Scum Lake	171a	Yes				
	Zenzaco	184	Yes				
	Avon Creek	188	Yes				
	Mosley Creek	332a	Yes		Riverside	CCM02203	
	Punkutlaenkut	131	Yes				
	S. Anahim Creek	186	Yes				
	Nimpo Creek	194	Yes				
	Upper Chilcotin	124a	Yes				
	Moore Creek	132	Yes				
	Unnamed	129	Yes				
	Upper Bidwell	183	Yes				
	McDermott	169	Yes				
	Bidwell Creek	179	Yes				
	Maxwell Creek	389	Yes				
	Aneko Creek	388	Yes				
	Palmer Lake	382	Yes				
	Eagle Lake	115	Yes				
	Minton	174	Yes				
	Hanceville	180	Yes				

Table 4. Project Status Summary for Watershed Units

The codes are: C = Completed, O = Ongoing, P = Planned, A = Accepted (pertains to Watershed Restoration Plan)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
Quesnel	John Boyd	493	I	John Boyd	C	C	C			C			O			O		
	Lightning	494	II	Lightning		C	C											
	Lower Nazko	381	V				C											
	Willow	103	I	Crescent Cr	C	C	C					O			O			
		103	I	Rebman	C		C			O		C	O		C	O		C
	Antler	100	II		C	C	C											
		100	I	Russian Creek	C	C	C			C			C		C	O		
	Fontaine	488	I		C	C	C			C		C	C		C	O		O
	Clisbako	391	V	Clisbako		C	C				C	C		C	C		O	O
	Cunning-ham	486	I	Cunningham	C		C	P				O			P			
	Swift River	483	I	Fontain		C	C			O	C	C	O	C	C		O	O
		483	I	Bendixon	C	C	C											
		483	I	Porter	C	C												
	Little Swift	490	I	Little Swift	C	C	C	P		O		C	O		O			
	Narcosli	291	IIB		C	C	C				O	O		P	P			
	Victoria Creek	478	III		C	C												
	Sovereign	491	I		C	C	C			P		P	P		P	P		
	Umiti	496	I		C	C	C			P		P	P		P	O		
	Mid Nazko	381a	V				C											
	Big Valley	106	I		C	C	C			O		O	O		O	O		
	Lower Bowron	104	V															
	Matthew	489	I	Matthew	C		C			O		O	O		P	O		P
	Fraser	283	I															
		283a	V															
	Ramsay Creek	293	V			C	C					O			O			
	Wentworth	392	V				C											
	Merston	296	V			C	C				P	C		P	O			
	Bazaeko	401	V			C	C				C	P						
		409	V			C	C				C	P						
		420	V			C	C				C	P						
	Tregallis	102	II	Tregallis	C	C	C					O			P			
	Ketchum	109	I		C	C	C			O		P	P		P	P		

Table 4. (Continued)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
Quesnel	Kimball	487	V	Kimball	C		C					O			P			
	Mcfarlane	398	V		C	C	C											
	Snaking	407	V		C	C	C											
	Bazaeko	394	V		C	C	C											
		399	V		C	C	C											
		402	V		C	C	C											
	Coglistiko	414	V		C	C	C											
	Summit	105	IIB		C													
	Udy	413	II		C	C	C											
	Webster	289	I		C	C	C											
	Twan	286	I		C	C	C											
	Unnamed	295	I		C	C	C											
		298	I		C	C	C											
Williams	Williams Lake	265a	I															
Lake	Lower Big Creek	142a	I			C	C											
	Lower Churn	243a	I			C	C					O						
	McLeese Lake	290	I															
	Hawks Creek	284	I															
	Fredy/ Beedy	462	I	Fredy/ Beedy	C	C	C			O	C	O	O	C	O		P	P
	Chimney	271	I															
	Mons Creek/Lake	165	I			C	C											
	Cooper Creek	158	I			C	C											
	150 Mile	280	I			C	C											
	Rose Lake	285	I															
	Upper Churn	243	I			C	C											
	Hungry Valley	142	I			C	C											
	Bambrick Creek	161	I			C	C											
	Unnamed Creek	166	I			C	C											
	Big Creek Mainstem	142b	I			C	C					O						
	Groundhog Cr.	155	I			C	C											
	Gaspard Creek	168	I			C	C					O						
	Farwell Creek	170	I															

Table 4. (Continued)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
Horsefly	*McKinley (Note: Also included in 100 Mile House FD)	445	I		C	O	C			O	P	P	O	P	P			
	Wolverine	472a	V		P		C			P			P					
	North Arm	464c	I		C		C			O		P	O		P			
	Woodjam	451	I	Upper Woodjam	C	C	C			C	C	C	C	C	C	P	P	P
	Horsefly Mainstem	453	I	Black Creek Area	C	C	C			C	O	O	O	O	O		O	O
	Keithley	480	IV		C		C											
	Mid Quesnel R	464a	V		P					P			P					
	Likely	464b	V		P					P			P					
	Moffat	448	I	Upper Moffat	C	O	C			O	O	O	O	P	O			
	Upper Cariboo River	472	I		C	C	C			C	P	C	O	P		P		
	Little River	479	I	Little River	C	C	C			C	C	C	P	C	O		P	
	Bill Miner / Kill Dog	464	I		C	C	C			O	O	O	O	P	P			
	Rullie	477	I		C	C	C			C	C	C	C	C	C	O		
	Roaring River	473	I		C	C	C			C			C					
	McKusky	450	I		C	C	C			O			O			P		
	Cameron	485	IIB	Cameron	O					O			O					
	Spanish	468	I		C	C	C			O	P	P	O	P	P			
	Sellers	470	I		C		C			O			O			P		
	Polley	463	V		P	C	C			P			P					
	Molybdenite	447	I	Molybdenite	C	C	C			O	O	O	O	P	P	P		P
	Wasko	467	V		C					C			C					
	Grain Creek	469	V	Grain	P	P	P			P			P					
	Upper Horsefly	455	I		C	P	P			O	P	P	O	P	P	P		
	Hen Ingram	465	III		C	C	C			O			O					
	Tisdale	452	I		C					C			O					
	Watt Creek	475	III		C					C			O					
	Beaver Valley	456a	V	Beaver Valley	C	C	C			P	C	C	P	O	P			
100 Mile House	Bonaparte River	77	II	Bonaparte River	O	C	C				O	O		O	O			
	Young Lake	77a	I	Bonaparte River	C	C	C		O	O		P	O		P			

Table 4. (Continued)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
100 Mile House	Fiftyseven Creek	86	I	Bonaparte River	O	C	C											
	Chasm	87	I	Bonaparte River	O	C	C											
	Fiftynine Creek	90	I	Bonaparte River	O	C	C											
	Scott Creek	91	I	Bonaparte River	C	C	C		O	O		O	O		O			
	Rayfield River	93	I	Bonaparte River	O	C	C											
	Eagan Lake	96	I	Bonaparte River	O	C	C											
Com-munity	Cutoff Valley Cr.	82	III	Bonaparte River	O	C	C											
Water -sheds	Clinton	84	III	Bonaparte River	O	C	C											
	Loon Lake	81	I	Bonaparte River	O	C	C											
	Brown Creek	95	I	Bonaparte River	C	C	C		O	O		O/P	O		O/P	P		
	Murphy Lake	371	I	Eagle / Bradley	C	C	C					C			O			
	Bridge	357a	I	Bridge Creek	C		C	O		P		P	P		P			O
	Bridge	357b	I	Bridge Creek						O			O					
	San Jose	273	II	San Jose River		C	C			O								
	Jim	360	I	Jim / Windy Cr.	O	P	C				P	C		P	O			
	Gorge Creek	78	I	Deadman River	C													
	Hamilton	85	I	Deadman River	C													
	Lang Lake	371a	I	Eagle / Bradley	C	C	C			O		O			O			
	Watch Lake	99	I	Bonaparte River	O	C	C											
	Lower Bridge/ Canim	357	I	Bridge Creek	C		C											
	Bradley	368	I	Eagle / Bradley	C	C	C				C	C		O	O			
	Peach Creek	374	I	Eagle / Bradley	C	C	C			O		O			O			

Table 4. (Continued)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
100 Mile House	Coffee	378	I	Eagle / Bradley	C	C	C			O		O			O			
	Boss	372	I	Boss / Hendrix	C	C	C	O			C	C		P	P			
	Hendrix	375	I	Boss / Hendrix	C		O	O				O			O			P
	Deception	373	I	Deception/ Spanish	C		C	O		O	N/A	C	O	N/A	O	P	N/A	O
	Spanish	377	I	Deception/ Spanish	C		C	O		O	N/A	C	O	N/A	O	P	N/A	O
	*McKinley (Note: Also included in Horsefly FD)	445	I	Horsefly River	O					O			O					
	Joe Ross Cr.	88	I	Deadman River	C					O			O					
	Green Lake	94	III	Bonaparte River	O	C	C											
	No name (?) Cr.	376	III	Eagle / Bradley	C	C	C					O			O			
Chilcotin	Chilcotin Lake	124b	I															
	Hanceville	180	I															
	Chilcotin	119	I															
	Alexis Creek	190	I															
	Upper Chilcotin	124	I	(east of river)	C					C			C					
	Haines Creek	171	I		C						C			C				
	Anaham Creek	185	I	Anaham	C	C	C			C	C		C	C				
	Alexis Lakes	187	I		C					C			C					
	Tatlayoko	327	I	Tatlayoko	C	C	C			C	C	O	C	C	O		O	O
		327a	I	Tatlayoko	C	C	C			C	C	O	C	C	O		O	O
	Clusko	130	I	Clusko	C	C	C			C			C					
	Charlotte Lake	70	I		C					C			C					
	Kappan Lake	74	I		C					C				C				
	Scum Lake	171a	I		C						C			C				
	Zenzaco	184	I		C					C			C					
	Avon Creek	188	I		C					C			C					
	Mosley Creek	332a	I		C	C	C			C	C	C	C	C	C			P
	Punkutlaenkut	131	I															
	S. Anahim Creek	186	I		C	C	C			C	C		C	C				
	Nimpo Creek	194	I		C					C			C					

Table 4. (Continued)

Forest District	Bucket Name	Buck. No.	Prelim. Water-shed Category	Sub-Basin Name	Overview Assessments			Watershed Restoration Plan		Prescriptions			Works			Routine Effectiveness Evaluation		
					Up Slope	Riparian	In Stream	Interim	Full	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream	Up Slope	Riparian	In Stream
Chilcotin	Upper Chilcotin	124a	I	(east of river)	C					C			C					
	Moore Creek	132	I		C					C			C					
	Unnamed	129	I		C					C			C					
	Upper Bidwell	183	I		C	C	C			C			C					
	McDermott	169	I		C					C			C					
	Bidwell Creek	179	I	Bidwell	C	C	C			C			C					
	Maxwell Creek	389	I		C													
	Aneko Creek	388	I		C													
	Palmer Lake	382	I		C													
		383	I		C													
		381b	I		C													
		386	I		C													
		381a	I		C													
		385	I		C													
		384	I		C													
	Clearwater	353	I		C					C			C					
		189	I		C					C			C					
		323	I		C					C			C					
		332	I		C					C			C					
		336	I		C					C			C					
	Miner Lake	347	I		C					C			O					
	Miner Lake	348	I		C					C			O					
	One Eye	351	I		C					C			C					
	Kappan	73	I		C					C			C					
	Hotnarko	76	I		C					O			O					
	Nimpo	191b	I		C					C			C					
	Holtry	193	I		C					C			C					
	Smokey	348a	I		C					O			O					
	Anahim	195	I		C					C			C					

3. Enhancing Environmental Values Research

3.1. Regional Prioritized List of Needs for Research and Intensive Effectiveness Monitoring

Table 5. Effectiveness Evaluations Required Under Enhancing Environmental Values.

Identifier	MYA Number	Effectiveness Evaluation Issue and Potential Benefits	Type of Effectiveness Evaluation			Category (1,2,3)	Estimated Budget 2002-03	Estimated Term of Evaluation (years)
			Routine	Intensive	Operational Techniques Refinement			
Weldwood (Williams Lake)		• Riparian Restoration – Little River and Cottonwood Trial	X			2	$3,000	3
		• Road Deactivation Sites 1,2,4,5,6,8,11,12	X			2	7,000	1
		• Road Deactivation Site 10	X			3	0	1
		• Road Deactivation – Little River, Cameron, Grain	X			3	0	2
		• McKinley Slide	X			1	600	3
		• S Rd. Slide	X			1	1,200	2
		• 8420 Slide	X			1	1,200	2
		• D Rd. Slide	X			1	600	2
		• Fish Culverts – 726.5 and 728 (Beedy)	X			2	600	1
		• Bridge Inspections – fish passage / structural	X			2	0	0
		• 8108	X			2	300	1
		• 2382	X			2	300	1
		• 551	X			2	300	1
		• 553	X			2	300	1
		• Ballock Cr.	X			2	300	1
		• Divan Cr.	X			2	300	1
		• Arbuthnot Cr.	X			2	300	1
		• Cameron Cr.	X			2	300	1
		• Grizzly Cr.	X			2	300	1
MOF (Quesnel)		• Cottonwood Unity sub-basin deactivation sediment reduction (.5 km)	X			1	$600	5
		• Cottonwood John Boyd Sub-basin sediment reduction (9.25 km)	X			1	2,400	5
		• Willow River Willow "A" (9.75 km)	X			1	2,400	5
		• Willow River Willow Big Valley 24A Rd. (5 km)	X			1	900	5
		• Willow River Big Valley 24D & E (35 km)	X			1	3,600	5
		• Willow River Big Valley 24A Branch 10 (25 km)	X			1	3,200	5
		• Bowron River Antler Creek Segment R04-BM1 (6.5 km)	X			1	1,200	5
		• 3100 Road Bioengineering (.5 km)	X			1	600	5
		• Ketchum Creek R22 C&D (21.5 km)	X			3	3,000	5
		• Ketchum Creek R22B (12.5 km)	X			3	2,200	5
		• Big Valley BV11 thru BV12D (25 km)	X			3	3,100	5

Table 5. (Continued)

Identifier	MYA Number	Effectiveness Evaluation Issue and Potential Benefits	Type of Effectiveness Evaluation			Category (1,2,3)	Estimated Budget 2002-03	Estimated Term of Evaluation (years)
			Routine	Intensive	Operational Techniques Refinement			
Weldwood – 100 Mile House		• Spanish and Deception Upslope Deactivation Works. Of the 6 sites, 2 were noted for inspection next spring, and a further 2 after a winter with above average snow pack.	X	2 sites in MOF Ford Project		1	$700 - 1000 for REE	REE 2 or 4 sites in 2002. Est. inspect all 6 sites again in 2007.
Weldwood – 100 Mile House		• Spanish and Deception Fish Access 4 minispan II culverts. All 4 should be inspected after a winter with an average or above average snow pack.	X			1	$500 for REE	If work needs to be carried out inspect 2002, and 2003.
Weldwood – 100 Mile House		• Spanish Deception Upslope deactivation works Assessments underway.	X			3	$500-$1000	
West Fraser (Ainsworth)		• The effectiveness of bioengineering for slope stabilization • To determine the conditions under which bioengineering techniques can be applied to obtain a significant improvement in cut and fill slope stabilization.						
MOF (Quesnel)		• The effectiveness of soil bioengineering. • To determine the effectiveness of different structure types used for stabilizing erosive hillslope processes.			X	1	$10,000	2 more years for a total of 5 years
MOF (–Region)		• Effectiveness evaluation of open stream crossings. • To determine techniques to design and construct more sustainable fords					$50,000	5 years
West Fraser (Ainsworth)		• The effectiveness of fish passage structures • To determine the most effective fish passage structures in replacing or upgrading current fish barrier culverts (i.e. arches, weirs, etc.)						
Weldwood (Quesnel)		• Effectiveness of deactivation structures • Currently in the third year of this project in the Rebman Creek watershed		X		1	$60,000	2 more years for a total of 5 years

Table 5. (Continued)

Identifier	MYA Number	Effectiveness Evaluation Issue and Potential Benefits	Type of Effectiveness Evaluation			Category (1,2,3)	Estimated Budget 2002-03	Estimated Term of Evaluation (years)
			Routine	Intensive	Operational Techniques Refinement			
WLAP (Region)		• Determine long term stability of instream structures of different anchoring techniques • To determine the most effective anchoring method for in-stream structures					$15,000	1
WLAP (Region)		• Fish redistribution in new habitat • To determine the population dynamics of fish associated with newly accessed habitats with road crossing improvements.					$15,000	3

Table 5(a) lists 5 topics for research under enhancing environmental values.

Table 5a. Needs for Research - Enhancing Environmental Values.

Multi-year Agreement Holder	MYA Number	Research Topic or Need	Rationale	Partners	Forest District in which the proposed research will be conducted	Priority	Length of Study (years)	Estimated Total Cost
Ministries		What effect does road deactivation have on prevention of stream sedimentation, and stabilization of stream sedimentation processes?	Should help to define under what conditions road deactivation should be undertaken.		Regional	High	5	$150,000
Ministries		Insitu analysis of culvert hydraulics affecting fish passage as these relate to the migratory requirements of the various life stages of fish.	Help determine the range of acceptable conditions for protecting migratory requirements of fish populations		Regional	High	5	$150,000
MOF		What are the optimal conditions for stabilization of erosion sites using re-vegetation techniques	Should give a clear idea of how much maintenance is required for typical stabilization of upslope areas		Regional	Moderate	5	$130,000
Ministries		Regionally significant criteria for evaluating both hazard and consequence of past forest practices on regional fish species.	Would determine objective criteria, indicating where restoration work has the highest priority and what risk reduction can be achieved through restoration activities		Regional	High	1	$50,000
WLAP		Quantification of stream sediment impacts to fish and water quality.	Increases accountability to public for expenditures on EEV – what is the opportunity cost of not stabilizing forest roads and streambank erosion?		Regional	High	3	$15,000

4. EEV Road Priorities

4.1. Priority Setting

Priorities for activities under the Road and Hillslope Management Plan have been estimated by two different methods. While each program has its own basis for priority setting, a number of other criteria are relevant to MOF's business priorities. The business priority for each activity is based on the risk of not completing the work and, in the interim, is derived from district knowledge of road use by various resource road users, such as mining, range, timber and recreation. In time, standard definitions for each of these will be developed. Risks and priorities for the business priority are designated as VH (very high), H (high) or M/L (moderate/low). In comparison, the program priority is based on the criteria and processes that are unique to that program. For example, under the EEV component of the RMP, the program priorities have been set according to the guidelines for that component.

Table 6 identifies some priority upslope work that should be incorporated into the Forest Renewal planning process, as these sites are considered relevant to the current goals of WRP.

Table 6. Some Identified EEV Priorities For Upslope Stabilization

Road Management Area	Bucket Number	Component Identifier	Access Strategy	Activity	Quantity: km or ha	Business Drivers							Business Priority	Program Priority	Program	Potential Proponent	Funding Pressure
						CCLUP Access Targets	Public Use	Provincial Revenue									
								Tourism / Resorts	Mining & Mineral Explor'n	Timber	Range/ Ranching	Fishery					
(e.g. Watershed Name)	(e.g. bucket)	(e.g. 6000 Road)	(e.g. maintain)	(e.g. RD)	(default km)												
SPANISH	468	93A-053-033		RR	1	H	H	M/L	H	H	M/L	H	M/L	M/L	EEV	MOF	$5,000
SPANISH	468	93A-053-050		RD	1	H	H	M/L	H	H	M/L	H	M/L	M/L	EEV	MOF	$4,000
SPANISH	468	93A-054-001		RD	1	H	H	M/L	H	H	M/L	H	M/L	M/L	EEV	MOF	$5,000
SPANISH	468	93A-054-003		HR	1 ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$40,000
SPANISH	468	93A-045-019		RD,LR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$5,000
SPANISH	468	93A-054-026		RR	1	H	H	M/L	H	H	M/L	H	M/L	M/L	EEV	MOF	$5,000
SPANISH	468	93A-064-026		RD,RT	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$15,000
SPANISH	468	93A-054-020		RR,LR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$5,000
SPANISH	468	93A-064-025		RD	1	H	H	M/L	H	H	M/L	H	M/L	M/L	EEV	MOF	$4,000
BILL MINER	464	93A-058-018		RR,LR	1km,1ha	VH	M/L	M/L	M/L	H	M/L	VH	H	H	EEV	MOF	$4,000
BILL MINER	464	93A-058-005		RD,HR	1km,1ha	VH	M/L	M/L	M/L	H	M/L	VH	H	H	EEV	MOF	$5,000
BILL MINER	464	93A-058-003		RD,LR	1km,1ha	VH	M/L	M/L	M/L	H	M/L	VH	H	H	EEV	MOF	$5,000
BILL MINER	464	93A-058-227		RD	1	H	M/L	M/L	M/L	H	M/L	H	M/L	M/L	EEV	MOF	$8,000
BILL MINER	464	93A-058-249		RD,HR	1km,1ha	VH	M/L	M/L	M/L	H	M/L	VH	H	H	EEV	MOF	$10,000
SELLER	470	93A-064-028		RD,HR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$5,000
SELLER	470	93A-064-027		RR	1	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$3,000
SELLER	470	93A-064-029		RD	1	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$2,000
SELLER	470	93A-064-016		RD	1	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$5,000
SELLER	470	93A-064-022		RD,RT	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$25,000
SELLER	470	93A-046-018		RD,LR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$10,000
SELLER	470	93A-064-081		RD,HR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$80,000
SELLER	470	93A-046-010		RD,HR	1km,1ha	VH	H	M/L	H	H	M/L	VH	H	H	EEV	MOF	$5,000
LITTLE RIVER	479	8417-8421		RD,HR	4km,2ha	VH	H	VH	M/L	H	M/L	VH	VH	H	EEV	MOF	$60,000
UPPER CARIBOO R	472	HARVEY CR.		RD,HR	15km,2ha	VH	H	M/L	VH	H	M/L	H	VH	H	EEV	MOF	$50,000
LITTLE RIVER	479	J ROAD		HR	1ha	VH	H	M/L	M/L	M/L	M/L	M/L	VH	H	EEV	MOF	$10,000
NORTHARM	464C	non-status		DAU	30	H	M/L	M/L	M/L	H	M/L	H	H	M/L	EEV	MOF	$25,000
MID QUESNEL R.	464a	non-status		DAU	30	H	M/L	M/L	M/L	M/L	M/L	H	M/L	M/L	EEV	MOF	$25,000
LIKELY	464b	non-status		DAU	30	H	VH	H	H	H	M/L	H	H	M/L	EEV	MOF	$25,000
KEITHLEY	480	non-status		DAU	30	VH	VH	VH	VH	H	M/L	H	VH	H	EEV	MOF	$50,000

Table 6. (Continued)

Road Management Area	Bucket Number	Component Identifier	Access Strategy	Activity	Quantity: km or ha	Business Drivers							Business Priority	Program Priority	Program	Potential Proponent	Funding Pressure
						CCLUP Access Targets	Public Use	Provincial Revenue									
								Tourism / Resorts	Mining & Mineral Explor'n	Timber	Range/ Ranching	Fishery					
(e.g. Watershed Name)	(e.g. bucket)	(e.g. 6000 Road)	(e.g. maintain)	(e.g. RD)	(default km)												
McKUSKEY	450	non-status		DAU	30	H	VH	VH	M/L	H	M/L	VH	H	M/L	EEV	MOF	$50,000
YOUNG	77a	non-status		DF		VH	H	H	M/L	VH	M/L	H	VH	VH	EEV	West Fraser	$50,000
YOUNG	77a	6315.01		MK		VH	H	H	M/L	VH	M/L	H	VH	VH	EEV	West Fraser	$35,000
SCOT CREEK	91	non-status		DF		H	H	H	M/L	VH	M/L	H	H	H	EEV	West Fraser	$10,000
BROWN CR.	95	non-status		DF		H	M/L	M/L	M/L	VH	M/L	H	H	H	EEV	West Fraser	$10,000
DECEPTION	373	non-status		DF		H	M/L	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$15,000
SPANISH	377	non-status		DF		H	M/L	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$15,000
BRIDGE	357a	non-status		DF		VH	VH	VH	M/L	VH	M/L	VH	VH	VH	EEV	West Fraser	$70,000
RAYFIELD R.	93	non-status		DF		VH	H	H	M/L	VH	M/L	H	H	H	EEV	West Fraser	$50,000
EAGAN LAKE	96	non-status		DF		H	H	H	M/L	VH	M/L	H	H	H	EEV	West Fraser	$20,000
McKINLEY	445	non-status		DF		VH	M/L	H	M/L	VH	M/L	H	H	H	EEV	Weldwood	$10,000
JIM	360	non-status		DF		VH	H	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$70,000
JIM	360	6061.01		MK		VH	H	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$35,000
JIM	360	6061.07		MK		VH	H	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$30,000
HENDRIX	375	non-status		DF		H	H	M/L	M/L	VH	M/L	H	H	H	EEV	Weldwood	$50,000
LOON LAKE	81	non-status		DF		H	H	H	M/L	VH	M/L	H	H	H	EEV	West Fraser	$50,000
WILLIAMS LAKE	265a	Mikkelson Cr.		RD	1.7 km	M/L	h	M/l	M/L	H	H	VH	H	H	EEV	Licensee	$10,000

4.2. Spreadsheet Key

A key to the EEV Roads spreadsheet (Table 6) is provided as follows.

- **Road Management Area**

This column identifies a land unit, which organizes the row information by watershed on an interim basis. In this way, the required outputs for EEV are easily transferred. Planning under EEV currently references core buckets by name and number, so both could be inserted here.

- **Bucket Number**

This column identifies the land unit by bucket number(s). Several bucket numbers may comprise a watershed.

- **Component Identifier**

This column identifies the road segment, system or network. This is typically the number or name of a road, although in the case of landslides, a unique identifier may be necessary.

- **Access Strategy**

This column identifies the access strategy for each road as upgrade, maintain, deactivate, or rehabilitate. These can be used in conjunction with the activity codes to determine non-standard codes, which are primarily set by the RMP component guidelines.

- **Activity Codes**

This column reflects a code that relates to some activity. Under EEV, FRBC codes include HR (hillslope rehabilitation) or RD (road deactivation. However, the standard for these road codes has been extracted from the Forest Road Management System pilot for consistency with other RMP components. The codes are provided in Table 7.

Table 7. Activity Codes and Their Expanded Meaning for EEV Roads

Activity Code	Expanded Meaning	Activity Code	Expanded Meaning
GATE	Gate	DJ	Outslope road
CLS	Close	DK	Inslope road
RST	Restrict	DL	Install / repair erosion protection
NEW	Construction	DM	Install / repair sediment basins
RAC	Reactivation	DN	Re-vegetate
REL	Relocation	DO	Pull back sidecast
WID	Widening	MB	Carry out brushing
BREPAIR	Bridge Repair	MC	Remove snags and danger trees
BREPLACE	Bridge Replacement	MD	Clean ditches
RSM	Routine Surface Maintenance	ME	Clean culvert inlets and outlets
STRM	Structural Maintenance	MF	Grade surface
CC	Stabilize slopes	MG	Stabilize sub-grade
CD	Rectify hazards	MH	Replace planks, delineators, etc.
DA	Install or repair cross-ditches	MI	Replace or repair cattle guard
DD	Remove cross-drains / stream culverts	MJ	Replace signs
DE	Clean or repair cross-drain / stream culverts	MK	Replace Culvert
DF	Back up cross-drain / stream culverts	NAC	No Action
DG	Clean ditches	HR	Hillside restoration
DH	Repair / replace bridges	LRU	Landing re-contouring
DI	Remove bridges	RD	Road Deactivation
		RR	Road re-contouring
		RT	Riparian Rehabilitation

- **Units**

This column is simply the quantity of road, hill slope or site relating to the activity. The default for units is kilometres (km) of road.

- **Business Drivers**

Three different criteria are used to assess the risk of not funding the specified activity in relation to both legislation and government function. Combining these criteria—CCLUP, public use and provincial revenue generators—describes the business drivers that rationalize the undertaking of work by the Ministry of Forests.

- **CCLUP Access Targets**

Maintenance of access to various percentages of land units (polygons) has been identified in the Cariboo-Chilcotin Land-Use Plan. Since this is plan has been legislated as a higher level plan under FPC, there is a need for funding to meet maintenance requirements. This column in the spreadsheet is meant to reflect the risk of not maintaining access for the various resource users as described in the 90-day implementation report if funding is not provided.

- **Public Use**

This column represents an indirect measure of risk to the government that potentially arises from public exposure and liability. The rating applies to the aggregate use of the watershed by the public in addition to any resource uses not exclusively classified as industrial. Public use includes hunting, fishing, trapping, First Nations interests, recreation, wildcraft, range, and guide outfitters.

- **Provincial Revenue Generators**

The criteria falling under this category characterize the risk of lost revenue to the province if the work is not undertaken. In general, the risk relates the revenue foregone to the cost of doing the work. That is, if the work is not done there is a high risk that the province will forego income that exceeds the cost of the work, say $10,000 for example, in lost royalties (e.g. stumpage), direct taxes, export taxes, and taxes on goods and services. Although this measure calls for some quantification, the risk ratings are relatively qualified based on the best information currently available.

- **Tourism/Resorts**

This column provides an estimate of the risk to provincial revenue that comes from Tourism. In the Cariboo region, the presence of resorts may help approximate more or less risk.

- **Mining and Mineral Exploration**

Local knowledge of historical resource use of the land unit for this category is used to estimate the risk to provincial revenue foregone as a result of road failure.

- **Timber**

This column provides an estimate of the risk to provincial revenue that relates to reduced reliability on fire protection, Standing Timber Inventory, timber access, wood manufacturing, silviculture, and other timber uses.

- **Range/Ranching**

This column represents the risk to provincial revenue that comes from range use or ranching, including provincial income from permitting, taxes on animal sales, or expenditures on fencing.

- **Fishery**

This column provides a relative estimate of risk to provincial income that is related to a sport and/or commercial fishery. This is one of the more difficult items to estimate because it is not part of the MOF business expertise.

- **Business Priority**

This column is a visual average or approximation of the aggregate risk to MOF business, based on the identified business drivers.

- **Program Priority**

This column represents the program priority that is assigned uniquely to each of the funding programs. For example, the priorities for EEV are based on VH, H, and M/L. Some systems will have a larger number of rating levels than others—four compared to three—so this needs to be flexible.

- **Funding Program**

This column identifies how the different activities are grouped, such that the activities are considered for funding under each respective program's priorities.

- **Proponent**

This column is an indication of which entity, government or private, that would likely be a proponent with whom funds for the work could be negotiated, based on the "user pays" principle. For example, if mining interests wish to maintain 4x4 access on a road, then there is a need to negotiate responsibility for funding that activity.

- **Funding Pressure**

This column is simply an estimate of the cost to complete the work under any given activity, without reference to time.

5. Appendix A. Contact and Support Personnel

Management Unit	Name	Affiliation
Cariboo Forest Region	Doug Krogel	WLAP/MSRM Region
	Bruce McFarlane	MOF Region
	Ken Gilbert	FRBC
	Trevor Andrews	WLAP Region
	Rick Mumford	RMP coordinator
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	Gerry Powell	Weldwood, Tolko
	Al Hunter	West Fraser
	Al Moi	West Fraser
Williams Lake TSA	Bruce Hopper	Weldwood
	James Moe	MOF, Horsefly District
	Ryan Weltz	Lignum
	Andy Turner	MOF, Chilcotin
	John Bradley	MOF, Williams Lake
	Daryl Taylor	West Fraser
	Rick Wheeler	Riverside
100 Mile House TSA	Peter Baggs	MOF, 100 Mile District
	Val Duffin	Weldwood, 100 Mile House

6. Appendix B. References Supporting EEV Component

None.

7. Appendix C. Authorized Signatories

Ministry of Forests

_____ Date: _____
Authorized Signatory

Ministry of Water, Land and Air Protection

_____ Date: _____
Authorized Signatory

CARIBOO FOREST REGION

RESOURCE MANAGEMENT PLAN

2002/2003

SUSTAINABLE HARVEST

September 15, 2001

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1. Regional Silviculture Priorities and Issues

The Cariboo Forest Region has undertaken extensive review and analysis of its long-term timber supply for the Williams Lake, Quesnel and 100 Mile House Timber Supply Areas (TSAs). Inter-agency committees of representatives from the Ministry of Forests (MOF), Ministry of Environment, Lands and Parks (MELP) and industry worked under the Timber Investment Strategy Committee (TISC) initiative from 1996 to early 1999 (CLMA, 1997; Cariboo Forest Region TISC, 1996, 1997; Timberline, 1998a, 1998b, 1999). As well, the Williams Lake TSA has undergone an additional Type 2 forest level analysis (Inland Timber Management, 2000) that assessed the impact of implementing various incremental silviculture scenarios. That report and those from TISC provide the most reliable framework currently available for the Sustainable Harvest component of the 2002/2003 Resource Management Plan.

Maintaining sustainable harvest levels in the Quesnel, Williams Lake and 100 Mile House TSAs is more a matter of timber quantity than quality, with the main priority being increasing the available timber supply. However, various opportunities exist in each of the TSAs for increasing timber quality and producing a range of lumber dimensions and quality.

Density management is the most assured means of increasing long-term harvest levels, based on local experience and modeling results. Through planting and juvenile spacing, second growth stands are able to reach target piece size without the threat of overcrowding and reduced stem diameter growth. Density management is therefore regarded as an effective means of moderating the adjustment to the long-term harvest level and improving timber supply, while ensuring that appropriate log sizes are available at rotation. Fertilization of managed stands is considered to be an effective means of improving the mid- to long-term timber supply.

1.1. Habitat Supply

1.1.1. Background

Habitat supply relies on the maintenance of natural patterns of forest structural complexity associated with the various seral stages across the landscape. This structural complexity includes both physical attributes (snags, decadence features, coarse woody debris (CWO), multiple canopies and stand gaps) and species composition or forest community characteristics.

Natural species composition and structural character are established at the early seral stage with changes following successional patterns as the forest grows older. The structural complexity of the early seral forests tends to be moderate, due to the heterogeneity of young forests, with natural shrub and deciduous communities contributing to increased early seral complexity. Immature and mature forests have the least complexity as they often crowd out herb and shrub communities through canopy closure. Such stands are typically low in representation of decadence attributes such as snags and CWD which are important habitat features. As the forest grows old, structural complexity tends to increase as the forest canopy develops gaps from older trees dying out, and one or more understory levels of younger trees becoming established. The overall patterns of structural and species composition develop in these ecosystems based on the intensity, frequency and size of the disturbance events that initiate or maintain the stands. This,

in turn, determines the time periods in which stands develop structural character and species composition.

Conservation of species composition and structural character of stands is implicit in the ecosystem-based approach to managing for biodiversity, as outlined in the Biodiversity Guidebook. This approach consists of managing for the species composition and structural patterns that are naturally associated with the main seral stages in the various ecosystems. A high priority is placed on maintaining minimum amounts of mature and old forest across the landscape, as the highest biodiversity values are associated with the diverse range of structural and species composition typically found in older forests. Current forest harvesting practices are based on shorter rotation cycles than present in natural ecosystems, resulting in much lower than natural amounts of mature and old forests being maintained across the landscape over the long term, along with much higher than natural amounts of early seral forests. Managed forests also tend to be structurally simple with altered communities, in comparison to natural representation.

1.1.2. Enhanced Forestry

Incremental silviculture activities, such as brushing and juvenile spacing, can greatly alter the natural species composition and structural character associated with the different seral stages. These treatments often significantly reduce early seral understory diversity (structural character and/or species composition), and the resulting negative impacts to habitat supply can persist through successive seral stages. However, potential also exists for incremental silviculture activities to have a benign or even beneficial impact on habitat supply when planned with consideration for habitat and biodiversity conservation.

Incremental silviculture can benefit habitat supply if timber objectives are properly integrated with the need to maintain or create stand structural character and natural species composition. Acceleration of stand development to address timber supply issues need not result in negative impacts to habitat supply if prescriptions include strategies to create or sustain representation of key attributes. Some potential applications of an integrated timber/habitat supply approach to enhanced forestry include:

- Clumpy spacing in Douglas-fir stand for mule deer winter range. This develops future canopy and stand attributes for snow interception, thermal cover and herb/shrub production. This treatment could be combined with commercial thinning designed for mule deer winter ranges.
- Forage and cover for bears. Creating stands of variable stem density to develop cover attributes and maximize production of forage shrubs and herbs in early and late seral stages (especially relevant to habitat conservation for grizzly bear); denning and day beds associated with large trees.
- Treatments designed to enhance caribou habitat. Closed canopy young forests could be re-designed to produce variable density stands that allow development of stand openings and typical herb/shrub communities while promoting development of lichen biomass.
- Riparian restoration. Treatments designed to accelerate development of coniferous and deciduous stands with typical herb/shrub communities along streams, wetlands and lakes where previous logging has removed forest cover, important riparian habitat, and large trees.
- Mitigation of effects of high Equivalent Clearcut Area. Acceleration of canopy and stand attribute development to permit faster hydrologic recovery of impacted watersheds.

Treatments should be designed to develop snow interception attributes as well as stand openings which will accumulate snow that is shaded from atmospheric influences. Accelerating the development of, or emulating, old forest features will slow runoff with commensurate benefit to fish and fish habitat including water quality.

- Re-establishment of natural species composition and mixed species stands. Treatments designed to permit re-establishment of typical forest communities will permit faster rehabilitation of landscapes where biodiversity targets are threatened. Impacts of previous disturbances and logging histories may be incrementally mitigated.
- Accelerate the of development of stands with appropriate mature and old forest attributes. For some ecosystems, especially those managed on uneven-aged silvicultural systems, treatments may accelerate development of certain attributes that contribute to seral condition. Treatments designed to accelerate development of mature and old forest may be applied strategically to re-establish habitat supply deficits resulting from short rotation forestry practices in landscapes with extensive logging history.

Incremental silviculture can have some detrimental effects on wildlife habitat including:

- Brushing, either manual or herbicide, removes the shrub and/or deciduous component over large portions of early seral, and consequently later successional stages, in certain ecosystems these are important components of habitat supply.
- Widespread juvenile spacing of large areas of marginal pine stands eliminates a significant portion of habitat supply for small mammals and their predators (*e.g.* snowshoe hare and lynx), and impedes wildlife movement patterns for many other species. Unspaced leave areas should be an integral component of treatment plans.
- Widespread application of commercial thinning and partial cutting removes important understory canopy layers, and may significantly reduce the structural (and sometimes species composition) complexity of mid, mature and old seral habitats.

1.1.3. Priorities for Habitat Maintenance and Enhancement

For the range of enhanced forestry activities included in the Sustainable Harvest component of the Resource Management Plan, the following principles need to be applied:

- Activities and treatments that are designed to deliver beneficial impact to habitat supply, as well as timber objectives, should be given the highest investment priority.
- The second priority for investment should be assigned to projects which intend to address timber objectives, but are designed to effectively mitigate impacts to habitat supply.
- Activities and treatments producing negative impacts on habitat supply, and designed purely for timber enhancement should be accorded the lowest priority for investment.
-

For all activities and treatments, WLAP is consolidating and developing standards to maintain or enhance habitat supply, and mitigate negative impacts to natural species composition and structural complexity attributes.

1.1.4. Integration of Habitat Supply and Timber Objectives

Problem forest type (PFT) utilization and commercial thinning are listed as having great potential in alleviating timber supply problems. The proposed extensive utilization of PFT's needs to be assessed in terms of landscape biodiversity impacts. Due to their extensive occurrence in certain areas, such as the three western supply blocks, PFT's make up a significant portion of the older forests. Consequently, they are the only forest types available for meeting varying portions of the mature and old seral targets in some landscape units (as outlined in the

Biodiversity Conservation Strategy). The area of PFT's surplus to landscape biodiversity requirements needs to be assessed by landscape unit before utilization levels can be determined.

Commercial thinning and juvenile spacing treatments need to be designed and directed to avoid negative impacts on structural character and species composition, and thus habitat supply.

This RMP proposes the following habitat related studies (see also section 8):

- Methodology for Identifying Commercial Thinning – create a decision support tool to help locate and evaluate suitable CT areas, possible in conjunction with other treatments.
- Caribou Habitat Enhancement – potentially increase available caribou habitat by thinning or rehabilitating dense pine stands in the west.

2. Summary of Silviculture Priorities by Management Unit

2.1. Quesnel TSA

Increasing the timber supply is the main priority for maintaining sustainable harvest levels in the Quesnel TSA. Current target rotations within the Quesnel TSA allow for a range of piece size objectives. The relatively stable wood flow within the TSA allows for considerations on improving wood quality. Licensees are currently including pruning for wood quality on a percentage of their areas with high site index. **The current MPB infestation may have future wood supply implications, the magnitude of which will not be known until the infestation has subsided.**

2.2. Williams Lake TSA

The addition of 745,540 ha of low site lodgepole pine significantly expands the Timber Harvesting Land Base, which substantially improves the current age class distribution and eliminates the short-term falldown projected in TSR1 (Inland Timber Management, 2000).

Nevertheless, target rotations will allow for a range of piece size objectives. During periods of severely constrained wood flow, it is expected that the average piece size will decrease near minimums of 12.5 cm for lodgepole pine and 17.5 cm dbh for other species.

Enhancing timber quality is not a priority for the Williams Lake TSA.

2.3. 100 Mile House TSA

There is a need to offset the minor short-term decline in timber supply (3%) in decades 3-6 for the 100 Mile House TSA. This objective is the focus of the incremental silviculture program and the Sustainable Harvest plan, and is likely to continue until the timber supply falldown is resolved. Enhancing timber quality is not a predominant issue.

Nevertheless, target rotations will allow for a range of piece size objectives. During periods of severely constrained wood flow, it is expected that the average piece size will decrease near minimums of 12.5 cm for lodgepole pine and 17.5 cm dbh for other species.

2.4. TFL 5

Further information provided under Section 6.

2.5. TFL 52

No strategic silviculture analysis information was available at the time of plan preparation. TFL 52 is currently under going a Type 2 Strategic Analysis.

3. Quesnel TSA Sustainable Harvest Outline

3.1. Basic Data

The Quesnel Timber Supply Area is the most northern TSA in the Cariboo Forest Region, located in the central interior of British Columbia. The TSA's climate varies from generally dry and cold in the west, due to the rain shadow influence of the Coast Mountains and Itcha-Ilgachuz Range, to milder and wetter towards the east where airflow rises over the Quesnel Highland. The Fraser River valley through the middle of the area is dry and warm. The area has a diverse range of ecosystems with extensive wetlands and water bodies and rolling topography intersected by major valleys.

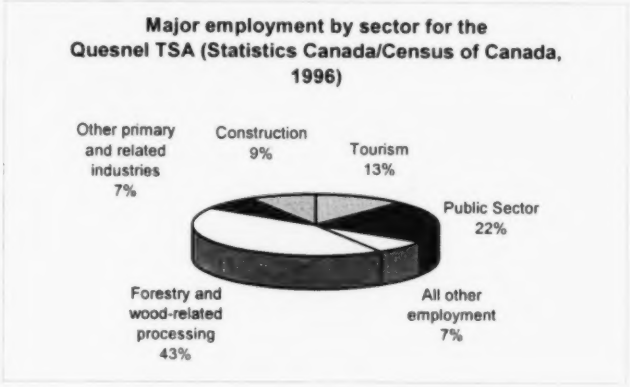
Major employment by sector for the Quesnel TSA (Statistics Canada/Census of Canada, 1996)
Other primary and related industries 7%
Construction 9%
Tourism 13%
Public Sector 22%
All other employment 7%
Forestry and wood-related processing 43%

Figure 1. Major employment by sector for the Quesnel TSA

From the city of Quesnel, the TSA stretches west past the community of Nazko to Eliguk Lake northwest of the Itcha-Ilgachuz Range, and east past Wells and Barkerville to the Bowron Lakes Provincial Park. The area also encompasses nine First Nations communities. The TSA covers 1.65 million ha, with approximately 81% as productive Crown forest (Pedersen, 1996a). Deductions to the productive forest land base, primarily due to problem forest types, habitat exclusions and environmentally sensitive areas, are shown in the Quesnel TSA Timber Supply Analysis of 1994 to bring the current harvesting landbase to 1.02 million ha, or 62% of the total landbase.

Figure 1 provides a summary of major employment by sector, and Figure 2 shows the age class distribution for the Quesnel TSA.

The allowable annual cut (AAC) was affected by outbreaks of mountain pine beetle in the early 1980's, requiring beetle control and salvage harvesting, as well as the operability of problem forest types and deciduous forest types. The current AAC of 3,248,000 m^3, set on July 1, 2001, is comprised of five components:

- Coniferous stands in the main TSA (1,965,500 m^3);
- Problem forest types (300,000 m^3);
- Deciduous volume partition (40,000 m^3); and
- Woodlots (34,500 m^3);
- Accelerated harvest for MPB (908,000 m^3)

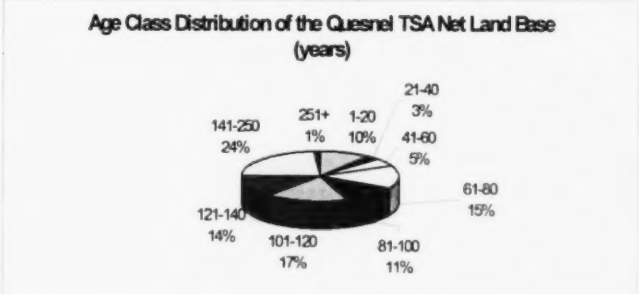

Figure 2. Age class distribution of the Quesnel TSA net land base.

The second Timber Supply Review (TSR2) was recently completed. The chief forester revised the AAC to 3,248,000 m^3.

3.2. Issues

Table 1 lists 16 issues relevant to the Quesnel TSA regarding sustainable harvest. The list was produced from the TSR1 AAC rationale (Pedersen, 1996a) and the TSR2 data package for the Quesnel TSA (BC Ministry of Forests, 1999b), with additional input from MELP staff. The issues and objectives may be modified in the future as a result of the new AAC rationale and the current MPB infestation.

Table 1. Sustainable harvest issues for the Quesnel TSA

Issue	Comments
Cariboo-Chilcotin Land Use Plan	The Cariboo-Chilcotin Land Use Plan (CCLUP) was announced by government in October, 1994 and adopted by Cabinet as a Higher Level Plan, with later amendment effective July 31, 1999. Management prescriptions contained in the CCLUP strategy reports have been modified by the Integration Report and are considered key information sources in Forest Development Plan direction. The TSR2 process relies on CCLUP information for the modeling of some prescriptions or constraints, which will affect long-term timber supply considerations in the RMP.
Landscape-level biodiversity	Landscape level biodiversity direction provided by the 1998 statutory decision maker letter reflects current practices, and will be used in developing the base case for TSR2. Practices are to be consistent with the *CCLUP Biodiversity Conservation Strategy* as influenced by the *CCLUP Integration Report* and the *Cariboo Region Landscape Unit Planning Strategy*.
Stand-level biodiversity	Wildlife tree patches are planned to reduce impact on the productive forest areas as much as possible.
Pulpwood Agreement (PA) #5	No harvesting is anticipated for PA #5 in the near future.
Problem Forest Types	TSR1 included a partition of 300,000 m^3/year for problem forest types (PFTs). Forest cover information was adjusted based on the results of an inventory study conducted in 1997. The inventory information was developed to allow a separate assessment of the PFTs for TSR2.
Mountain pine beetle salvage harvesting	Recent increases in salvage requirements may affect short-term harvest levels and longer-term timber supply.
Old Growth Site Index/Site productivity	Current research shows that the site indices for stands older than 140 years are below actual productivity. Until regional information is available, the provincial site index adjustments will be applied as a sensitivity analysis in TSR2.
Goal 2 protected area candidates	These areas are still proposed and will be relocated through sub-regional planning. Goal 2 areas are not incorporated into the base case for TSR2. These areas amount to 0.25% of the timber harvesting landbase of the total CCLUP area, but their locations are unclear as well as how much of the TSA will be designated as protected areas. TSR2 will determine the potential impact on timber supply through a sensitivity analysis.
Deciduous component in the timber supply	A portion of the TSA was re inventoried in 1997. This information will improve the assessment of the deciduous component in TSR2.
Not satisfactorily restocked (NSR) areas	In 1999 there were 4698 ha of backlog NSR and 18,328 ha of current NSR area. TSR2 will model the restocking of current NSR within the regeneration delay, and the backlog NSR within 10 years.
Species conversion	TSR1 raised species conversion as an issue requiring further assessment. Inability to link original forest cover information to current forest cover frustrated the analysis, but species conversion is not considered a major problem for TSR2. Fill and incremental planting treatments should consider this issue.
Cariboo River Management Area	No more than 15% of the productive forest area may be below the green-up height to ensure sufficient moose habitat is maintained.

Issue	Comments
Wildlife habitat	Current caribou habitat management direction permits harvesting in 35% of the previously deferred area, but confirmation will depend on results of research underway on partial cuts to maintain terrestrial lichens. Eastern caribou habitat is restricted from harvesting, pending the results of ongoing research on group selection systems to maintain arboreal lichens and the implementation of the caribou strategy. The mule deer winter range strategy for harvesting in the IDF allows for no harvesting on some ranges, with limited selection harvesting and extended rotations on others. Exceptions are allowed to address mountain pine beetle salvage. Clumpy spacing is recommended in Douglas-fir – leading immature stands where enhanced forestry activities are proposed. For grizzly bear, moose, furbearer, species at risk, implementation strategies for CCLUP requirements to manage for these species' habitat are being developed on an ongoing basis; for enhanced forestry activities, standards for maintaining habitat supply will include considerations for these species.
Riparian habitat	The inclusion of riparian reserves and management zones may reduce the productive forest land area with potential impact on the availability of mature volume for harvesting.
Green-up	The current minimum height requirement of 3 m to achieve green-up currently equates to an age of 17 to 22 years. Spruce stands may not be achieving that prediction, however, and OGSI may calculate stands reaching 3 m in less time. The effects on long-term timber availability are included as a high priority study in the Sustainable Harvest strategic objective.
Community dependence	As shown on page 1 under Basic Data, over 1/3rd of total employment in the TSA relies directly on the forest industry. Public input is most prominent on this socio-economic issue. Future Timber Supply Reviews and AAC determinations will need to balance timber availability with community dependence and opportunities for development of alternate economic bases.

3.3. Opportunities to Increase Timber Supply

The Stand Treatments Analysis report for the Quesnel TSA (Timberline, 1998a) outlines the methodology used in the timber supply analysis. FSSIM 3.0, a forest-level simulation model, predicted the development of a forest over a 250-year planning horizon based on initial forest conditions, expected patterns of growth, harvesting and regeneration rules, and assumptions for non-timber resources. A list of the analysis options, with a brief description of each and its effect on timber supply, is provided in Table 2 to demonstrate the breadth of scenarios tested and examined.

Table 2. Analysis options and their effect on timber supply for the Quesnel TSA (Timberline, 1998a)

Analysis Option	Description	Effect on Timber Supply
Base Case	The management assumptions, land base net downs, general growth and yield parameters and forest cover requirements from TSR1 were used, with some minor changes to the development of analysis units to better reflect anticipated TSR2.	The indicated current harvest level of 2,340,000 m^3/year for the main TSA is sustainable over an even flow planning horizon, and could increase up to 20% by using managed stand yields. The uneven flow analysis resulted in a short term harvest of 3,902,000 m^3/year, dropping over 4 decades to a long-term harvest level of 2,723,100 m^3/year, which can be sustained through the entire 250-year planning horizon.
Old Growth Site Index adjustments	OGSI adjustment equations, including SIBEC, were used to more accurately assess productivity of stands older than 140 years.	Produces a long-term harvest gain of 12% for the even flow scenario, and 10% short-term and 5% long-term gains for the uneven flow scenario.

Analysis Option	Description	Effect on Timber Supply
Reduced Regeneration Delay	The regeneration delay for all current and backlog NSR was reduced by 2 years.	Reducing regeneration delay for all current NSR improves the mid- and long-term gains by 3%.
Problem Forest Type Rehabilitation	Limits to area harvested were removed to determine the impact of the transition from PFT to managed stands. All stands were assumed to regenerate to lodgepole pine.	Produces a 3% gain in the even flow scenario, and a 5% gain in the short term in the uneven flow scenario.
Genetically Improved Planting Stock	Site index was adjusted by 3%, 5% and 7% to represent a range of expected responses to tree improvement gains by using genetically improved lodgepole pine and white spruce.	Produces a 5% to 7% gain under the even flow scenario, a 10% to 15% short-term gain and a long-term volume gain of up to 4% above base case for the uneven flow scenario.
Density Management	Spacing to three densities: 1200, 2400 and 3600 stems per ha.	Produces a 3% to 7% gain in the even flow scenario and a short-term gain of 5% - 14% under the uneven flow scenario.
Reducing Lost Productive Area from Future Roads	Reduction of current and future lost productive area to roads and landings by 50%.	Produces a 3% gain in the even flow analysis, and a 9% gain in the short term for the uneven flow analysis.
Fertilization and Spacing	Volume of all eligible lodgepole pine managed stands was increased by 15 and 40 m^3/ha at rotation to reflect gains from one and two fertilization treatments, respectively.	Even flow gain of 8% and 10%, and uneven flow short term gain of 5% and 10% for the combined treatments.
Elimination of Backlog NSR	The base case scenario of 10 years to eliminate all backlog NSR (areas harvested before 1987) was reduced to 0 years.	Regenerating all backlog NSR immediately produces a 2% gain for the even flow scenario, and a 4% short-term gain for the uneven flow scenario.
Commercial Thinning	One-pass volume removal of 30% from 40 – 60 year old natural and managed Douglas-fir and lodgepole pine stands on good and medium sites. In this analysis, spacing to 2400 stems per hectare was used as the base case. Final harvests were delayed for a minimum of 20 years after thinning.	Marginal gains are realized under the even flow scenario. A short-term gain of 5% is achieved under the uneven flow scenario.
Combination of Commercial Thinning and Fertilization	The same commercial thinning methodology is modeled as above with fertilization responses of 15 and 40 m^3/ha for one and two applications.	One and two fertilizer applications produced gains of 2% and 3%, respectively, under the even aged analysis, and 7% and 10%, respectively, under uneven flow.

The Stand Treatments Analysis report also lists the changes in harvest level compared to the base case for all tested treatments and treatment regimes for the TSA (Table 3). Two timber flow alternatives were used to evaluate stand treatments—even flow and uneven flow. In all phases of the analysis, the harvest flow objectives were to:

- begin at as high a harvest level as possible;
- sustain the initial harvest level for as long as possible;
- achieve short and mid-term harvest levels that do not drop below a minimum long-term sustainable level;
- raise the long run sustainable harvest levels to reflect managed stand yields; and
- limit shifts in harvest to less than 10% per decade.

Table 3. Analysis results for even flow and uneven-flow (short term and long term) scenarios for the Quesnel TSA (Timberline, 1998a)

	Even Flow		Uneven Flow			
			Short Term		Long Term	
Scenario	Harvest (000's m3/ha)	Change from Base Case	Harvest (000's m3/ha)	Change from Base Case	Harvest (000's m3/ha)	Change from Base Case
Base Case	2723	n/a	3902	n/a	2723	n/a
OGSI Adjustments	3006	12%	4256	10%	2841	5%
Reduced Time to Regenerate Backlog NSR	2770	2%	4044	4%	2723	0%
Reduced Regeneration Delay by 2 years	2794	3%	4079	5%	2723	0%
Genetically Improved Stock; Low (3%)	2841	5%	4256	10%	2723	0%
Genetically Improved Stock; Moderate (5%)	2888	7%	4433	15%	2723	0%
Genetically Improved Stock; High (7%)	2935	9%	4433	15%	2817	4%
Density Management; 3600sph	2794	3%	4079	5%	2723	0%
Density Management; 2400sph	2888	7%	4398	14%	2723	0%
Density Management; 1200sph	2865	6%	4256	10%	2723	0%
Fertilization; redefined Base Case	2888	n/a	4398	n/a	2723	n/a
One Application; 15 m^3/ha increase	2912	8%	4433	5%	2723	0%
Two Applications; 40 m^3/ha increase	2959	10%	4610	10%	2723	0%
PFT Rehabilitation	2794	3%	4079	5%	2723	0%
Rehabilitate 50% of Roads and Landings	2794	3%	4221	9%	2723	0%
Commercial Thinning; redefined Base Case	2888	n/a	4398	n/a	2723	n/a
Commercial Thinning	2912	1%	4610	5%	2723	0%
Commercial Thinning and Fertilization; redefined Base Case	2888	n/a	4398	n/a	2723	n/a
Commercial Thinning and Fertilization; One application; 15 m^3/ha increase	2935	2%	4681	7%	2723	0%
Commercial Thinning and Fertilization; Two applications; 40 m^3/ha increase	2959	3%	4786	10%	2723	0%

3.4. Opportunities to Increase Timber Quality

Pruning is well documented as a treatment to improve timber quality (BC Ministry of Forests, date unknown; Barber, 1997). Other technical sources include the Technical Background Information, Timber Enhancement Strategy report, prepared by the Cariboo Lumber Manufacturers' Association (1997), that summarizes technical information on silviculture treatment benefits. The report lists pruning of young stands as a means to improve stem quality and log value at harvest. Stands most eligible for pruning have a high site index, developed access and close proximity to manufacturing facilities.

Some pruning has occurred in the Quesnel TSA and a moderate level of pruning activity is expected to continue to address anticipated future demand for veneer and value added products.

3.5. Quesnel TSA Sustainable Harvest Data

3.5.1. Enhanced Forestry Table

Quesnel TSA SH Summary
Enhanced Forestry Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Stand Tending	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	3824	2765	2252	2097	2497	23.69	90600	
Spacing	550	450	450	450	450	487.27	268000	
Pruning	184	248	160	150	196	1,089.13	200400	
Fertilizing	1518	1718	1618	1416	1416	346.41	525850	
Other	0	0	0	0	0	0.00	0	
Totals hectares	6076	5181	4480	4113	4559	178.55	1,084,850	
Planning and prescriptions							77400	
Total dollars							1,162,250	
Forest Health Enhancement								
Spacing	0	0	0	0	0	0.00	0	
Pruning	20	20	0	0	0	999.85	20000	
Other treatments	0	0	0	0	0	0.00	0	
Totals hectares	20	20	0	0	0	999.45	20,000	
Habitat Supply and Biodiversity Enhancement								
Riparian treatments	0	0	0	0	0	0.00	0	
Non-riparian treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Domestic Range								
Treatments	0	0	0	0	0	0.00	0	
Enhanced Forestry Activities - Management Unit Total								
Surveys	3824	2765	2252	2097	2497	23.69	90,600	
Spacing	550	450	450	450	450	487.27	268,000	
Pruning	204	268	160	150	196	1,080.38	220,400	
Fertilizing	1518	1,718	1,618	1,416	1,416	346.41	525,850	
Other stand tending activities	0	0	0	0	0	0.00	0	
Totals hectares	6096	5201	4480	4113	4559	181.24	1,104,850	
Planning and prescriptions							77,400	
Studies funding - SIA							171909	
Total dollars							1,354,159	

3.5.2. Backlog Program Table

Quesnel TSA SH Summary
Backlog Program Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Legal Obligations	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	172	207	275	300	150	20.00	3440	
Site preparation	150	0	0	0	0	899.98	135000	
Planting	225	250	0	0	0	533.33	120000	
Brushing	253	375	130	30	30	518.57	131200	
Max. density spacing	0	0	0	0	0	0.00	0	
Totals hectares	800	832	405	330	180	487.04	389,640	
Seed purchase	300000	0	0	0	0	0.40	120000	
Total legal obligations							509,640	
Backlog Reforestation								
Surveys	7000	7000	5000	4800	4800	22.00	154000	
Site preparation	20	20	0	0	0	899.91	18000	
Planting	135	20	20	0	0	399.99	54000	
Brushing	300	300	300	200	200	600.00	180000	
Totals hectares	7455	7340	5320	5000	5000	54.46	406,000	
Seed purchase	0	0	0	0	0	0.00	0	
Prescriptions and planning dollars							25000	
Total backlog reforestation							431,000	
Impeded areas								
Surveys	2250	2000	2000	2000	2000	20.00	45000	
Brushing	660	550	400	300	200	480.30	317000	
Density spacing	0	0	0	0	0	0.00	0	
Totals hectares	2910	2550	2400	2300	2200	124.40	362,000	
Prescriptions and planning dollars							30000	
Total impeded areas							392,000	
Site Restoration								
Fill planting	0	0	0	0	0	0.00	0	
Rehabilitation	0	0	0	0	0	0.00	0	
Reforestation	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Seed purchase	0	0	0	0	0	0.00	0	
Prescriptions and planning dollars							0	
Total site restoration							0	
Backlog Program Activities - Management Unit Total								
Surveys	9422	9207	7275	7100	6950	21.49	202440	
Site preparation	170	20	0	0	0	899.95	153000	
Planting	360	270	20	0	0	483.32	174000	
Brushing	1213	1225	830	530	430	517.89	628200	
Density spacing	0	0	0	0	0	0.00	0	
Totals hectares	11165	10722	8125	7630	7380	103.68	1157640	
Seed purchase	300000	0	0	0	0	0.40	120000	
Prescriptions and planning							55,000	
Recommended studies							0	
Total backlog program							1,332,640	

* Seed purchase includes seedlings purchase. Units are number of seedlings, or specify.

3.5.3. *Performance Measures Based on Activities Planned for 2002/2003*

Quesnel TSA SH Summary
Performance Measures Based on Activities Planned for 2002/2003
Based on Type 2 Silviculture Strategy

	Performance Measure	Tree Improve-ment	Nursery Seedling Production	Silv. Survey	Site prep.	Backlog Plant	Brush	Space	Prune	Fertilize	Support staff and admin	Totals
	Inputs											
A	**Planned treatment area (ha) in 2002/2003**	360	0	4,371	170	360	1,213	550	204	1,518	8,746	
1.0	**Timber Supply**											
1.1	Potential volume/ha gain (m3/ha/yr)	0.41	0	0	0	2.9	0.41	0.25	0	0.40		
1.2	Years the factor will apply	80	65	65	80	80	65	65	65	65		
1.3	Pot. total merch. volume increment in 65 years (m3)	11,808	0	0	0	84,675	32,327	8,938	0	39,468		**177,216**
1.4	Est. yrs reduced to achieve management objectives	5-10	1-3	5-10	0	5-20	5	5-30	0	5-10		
1.4	Est. area that will be reclassified as stocked (ha)			835								**835**
1.5	Est. area that will be declared as free growing (ha)			2,556								**2,556**
2.0	**Wood Value**											
2.1	Percent improvement in total value at harvest (Compared to no treatment)							5-15%	15-30%	1-5%		
3.0	**Employment**											
3.1	Estimated short term employment (person days/ha)	0.1	0.34	0.1	0.95	2	2.61	3.96	4.54	0.18	0.1	
3.2	Estimated total employment (person days/year)	36	0	437	162	720	3,166	2,178	926	273	875	
3.3	Estimated total full time equivalent positions (FTE)	0	0	2	1	4	18	12	5	2	5	**49**
4.1	**Forest Health Enhancement (ha)**											**20**
5.1	**Habitat Supply**											
5.2	Planned area for specific wildlife forage or habitat maintenance in 2002/2003 (ha)											**0**
5.3	Est. area with secondary value provided to biodiversity (ha)											**0**

3.5.4. Studies Table

See section 8 Cariboo Region Special Studies Summary

3.5.5. Quesnel TSA Summary Table

Management Unit Name

Management Unit Summary Table

For the 2002/03 Fiscal Year

	Treatment Area Goals (ha)					Plan 2002/03	
	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)
Enhanced Forestry Program Field Activities	6,096	5,201	4,480	4,113	4,559	181	1,104,850
Planning, prescriptions and seedlings							249,309
Backlog Program Field Activities	11,165	0	0	0	0	104	1,157,640
Planning, prescriptions and seedlings							175,000
Totals	17,261	5,201	4,480	4,113	4,559		2,686,799

Performance Measures

Potential total merchantable volume increment in 65 years	177,216 m^3
Estimated ha that will be reclassified as stocked	835 ha
Estimated ha that will be declared as free growing	2,556 ha
Estimated total full time equivalent positions generated	49 FTEs
Forest health enhancement area	20 ha
Planned area for specific wildlife forage or habitat maintenance	0 ha
Estimated area with secondary value provided to biodiversity	0 ha

4. Williams Lake TSA Sustainable Harvest Outline

4.1. Basic Data

The Williams Lake Timber Supply Area is located in a roughly middle east-west band of the Cariboo Forest Region in the central interior of British Columbia. The TSA's climate varies from generally dry and cold in the west due to the rain shadow influence of the Coast Mountains, to milder and wetter where airflow rises due to the Quesnel Highland to the east, with a very dry and warm Fraser River valley between. The area has a diverse range of ecosystems with extensive grassland areas and wetlands, and rolling topography intersected by major valleys.

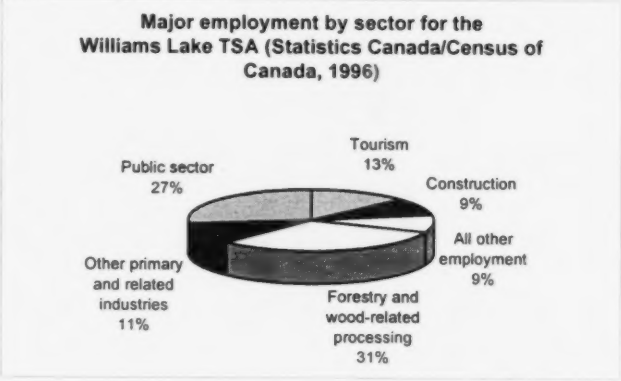
Major employment by sector for the Williams Lake TSA (Statistics Canada/Census of Canada, 1996)
Tourism 13%
Public sector 27%
Construction 9%
All other employment 9%
Other primary and related industries 11%
Forestry and wood-related processing 31%

Figure 3. Major employment by sector for the Williams Lake TSA.

From the city of Williams Lake, the TSA stretches west past the communities of Alexis Creek and Anahim Lake to Tweedsmuir Provincial Park, and east beyond Horsefly and Likely to Wells-Gray Provincial Park. The area also encompasses ten First Nations communities. The three forest districts within the TSA—Chilcotin district (based in Alexis Creek), Williams Lake and Horsefly—cover 4.9 million ha, with approximately 69% as productive Crown forest. Deductions to the productive forest land base, primarily due to problem forest types, bring the current harvesting landbase to 1.7 million ha, or 34% of the total landbase. The Williams Lake TSA is commonly addressed in two portions—the main TSA and the more remote three western supply blocks.

Figure 3 provides a summary of major employment by sector, and Figure 4 shows the age class distribution for the Williams Lake TSA.

The allowable annual cut has been affected for the last 20 years by outbreaks of mountain pine beetle and the need for beetle control and salvage harvesting. The current AAC of 3,807,000 m^3, set on January 1, 1996, is comprised of four components:

- Coniferous stands in the main TSA (2,500,000 m^3), with at least 100,000 m^3 annually from problem forest types
- The three western supply blocks (350,000 m^3)
- Problem forest types in Pulpwood Agreement #16 (107,000 m^3)
- Stands damaged or killed by mountain pine beetle (850,000 m^3)

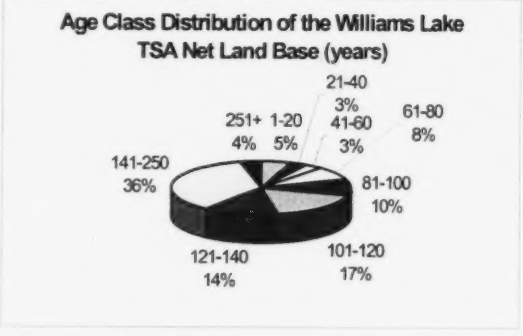

Figure 4. Age class distribution of the Williams Lake TSA net land base

The second Timber Supply Review (TSR2) is in progress and expected to be complete in 2002.

4.2. Issues

Table 4 lists 16 issues affecting timber supply from the perspectives of timber quality and quantity, forest health and habitat supply. They are summarized from the TSR1 AAC rationale (Pedersen, 1996b) and the TSR2 data package (BC Ministry of Forests, 1999c) for the Williams Lake TSA, with additional input from MELP staff.

Table 4. Sustainable harvest issues for the Williams Lake TSA.

Issue	Comments
Cariboo-Chilcotin Land Use Plan	The CCLUP was announced by government in October, 1994 and adopted by Cabinet as a Higher Level Plan with later amendment effective July 31, 1999. Management prescriptions contained in the CCLUP strategy reports have been modified by the Integration Report and are considered key information sources in Forest Development Plan direction. The TSR2 process relies on CCLUP information for the modeling of some prescriptions or constraints, which will affect long-term timber supply considerations in the RMP.
Landscape-level biodiversity	Seral stage distribution targets recommended in the *Biodiversity Conservation Strategy* will be used for achieving biodiversity objectives outlined in the CCLUP.
Stand-level biodiversity	Wildlife tree patches are planned to reduce impact on the productive forest area as much as possible.
Pulpwood Agreement #16 timber supply	107,000 m^3/year was partitioned in TSR1 for PA #16. These forest types will be segregated for TSR2.
Problem Forest Types	TSR1 included a partition of at least 100,000 m^3/year from PFT's. The new "marginal forest types" classification consists of stands likely be harvested and subsequently contributing to TSA harvest levels. Requires impact assessment regarding landscape biodiversity targets.
Mountain pine beetle salvage harvesting	New criteria for stands damaged or killed by mountain pine beetle are in use to address biodiversity objectives. Recent increases in salvage requirements, however, may affect short-term harvest levels and longer-term timber supply.
Inventory audit	A 1998 inventory audit of the TSA showed that the inventory may overestimate mature volumes by 13% for all species groups. Polygon volumes consistently overestimated in the SBS and IDF zones. Volumes in other zones may be under-estimated. TSR2 will include further review of the audit information and consideration of forest management practices.
Old Growth Site Index	Current research shows that site indices for stands older than 140 years are below actual productivity. Until regional information is available, the provincial site index adjustments will be applied as a sensitivity analysis in TSR2.
Lignum Innovative Forest Practices Agreement	The IFPA gives Lignum the opportunity to test innovative forestry practices for increasing AAC and implementing successful practices in the TSA.
Anahim Round Table consensus document	Until the ART sub-regional plan is finalized, river buffers identified in the ART document may be modeled in a sensitivity analysis.
Goal 2 protected area candidates	The remaining .25% of the TSA for designation as protected areas may be used to determine potential impact on timber supply through a sensitivity analysis.
Visually sensitive areas	Partial retention was used as the Visual Quality Objective in TSR1, but anticipated tourism pressures may find this to have overestimated the timber supply, particularly in the eastern portion of the TSA.

Issue	Comments
Wildlife habitat	Western caribou habitat requirements reduce harvesting to 35% of area, but confirmation will depend on results of research underway on partial cuts to maintain terrestrial lichens. Eastern caribou habitat is deferred from harvesting until 2008, pending the results of ongoing research on group selection systems to maintain arboreal lichens and the implementation of the caribou strategy. Mule deer winter range strategy for harvesting in the IDF allows for no harvesting on some ranges with limited selection harvesting and extended rotations on others. Grizzly bear, moose, furbearer, species at risk – implementation strategies for CCLUP requirements to manage for habitat for these species are being developed on an ongoing basis; for enhanced forestry activities, standards for maintaining habitat supply will include considerations for these species.
Riparian habitat	The inclusion of riparian reserves and management zones may reduce the productive forest land area with potential impact on the availability of mature volume for harvesting.
Green-up	The current minimum height requirement of 3 m to achieve green-up currently equates to an age of 17 – 22 years. Spruce stands may not be achieving that prediction. OGSI may calculate stands reaching 3 m in less time. The effects on long-term timber availability will be included as a high priority study in the Sustainable Harvest strategic objective.
Community dependence	As shown on page 1 under Basic Data, approximately 1/3rd of total employment in the TSA relies on the forest industry. Public input is most prominent on this socio-economic issue. Future Timber Supply Reviews and AAC determinations will need to balance timber availability with community dependence and opportunities for mitigating projected falldowns with development of alternate economic bases.

4.3. Opportunities to Increase Timber Supply

The Stand Treatments Analysis report for the Williams Lake TSA (Timberline, 1999) outlines the methodology used in the timber supply analysis. FSSIM 3.0, a forest-level simulation model, predicted the development of a forest over a 250-year planning horizon based on initial forest conditions, expected patterns of growth, harvesting and regeneration rules, and assumptions for non-timber resources. A list of the analysis options with a brief description of each and its effect on timber supply is provided in Table 5 to demonstrate the breadth of scenarios tested and examined.

The Williams Lake TSA has undergone an additional Type 2 forest level analysis (Inland Timber Management, 2000) that assessed the impact of implementing various incremental silviculture scenarios. Analysis of the effects of silviculture scenarios on sustainable harvest volume are summarized in Table 6. The reports by Inland Timber Management and TISC provide the most reliable framework of technical information that is currently available.

Table 5. Analysis options and their effect on timber supply for the Williams Lake TSA (Timberline, 1999)

Analysis Option	Description	Effect on Timber Supply
Base Case	The management assumptions, land base net downs, general growth and yield parameters and forest cover requirements from TSR1 were used, with some minor changes to the development of analysis units to better reflect anticipated TSR2.	The indicated current harvest level of 2,670,000 m^3/year for the main TSA will decrease 30% by decade 5. A long-term harvest level of 1,971,000 m^3/year starting at decade 10 can be sustained through the remainder of the 250-year planning horizon.
Old Growth Site Index adjustments	OGSI adjustment equations, including SIBEC, were used for interior spruce and lodgepole pine to more accurately assess productivity of stands older than 140 years.	Long-term harvest gain of 22.6% for the main TSA and 8.1% for the 3 western supply blocks.
Reduced Time to Green-up	Green-up period for the IRM and visual constraint areas was reduced by 3 years to 13 and 12 years, respectively, to better reflect stand treatments such as brushing and fertilization that can reduce the time for stands to reach 3 m in height.	Not specifically reported but instead incorporated with other analysis options.
Reduced Regeneration Delay	Regeneration delay for all current and backlog NSR was reduced by 2 years and to 0 years.	Reducing regeneration delay for all current NSR improves the mid- and long-term gains by 2-5%.
Problem Forest Types	Inclusion of cedar-hemlock, balsam, wetbelt Douglas-fir, spruce and lodgepole pine PFTs, which are currently excluded from the forest land base due to low merchantability.	Only pine PFTs produced any significant effect to harvest levels. Three levels of utilization (100%, 50% and 25%) produced significant gains in both the Main TSA and 3 western supply blocks, most notably in the 3 western supply blocks where pine PFTs are predominant.
Genetically Improved Planting Stock	Tree improvement gains of 12% volume increase at rotation were used by adjusting site index with two candidate groups reviewed, lodgepole pine included and excluded.	Produces a long-term volume gain of 11.4% above base case.
Alternative Spacing Intensities	Double and triple the current estimated area juvenile spaced per year.	Long-term benefit of 1.2% - 3.5%.
Reducing Lost Productive Area from Future Roads	Reduction of lost productive area by 1% and 2% for future roads.	Long-term harvest increases of 1-2% for both the main TSA and 3 western supply blocks.
Fertilization and Spacing	Volume of all eligible lodgepole pine managed stands was increased by 15 m^3/ha at rotation to reflect gains from one fertilization treatment.	Long-term gain of 3.8% for the main TSA and no gain for the 3 western supply blocks.
Elimination of Backlog NSR	The base case scenario of 10 years to eliminate all backlog NSR (areas harvested before 1987) was reduced to 5 and 0 years.	Regenerating all backlog NSR in 5 years produces an 8% long-term gain for the main TSA and 2.5% mid-term gain for the 3 western supply blocks.
Commercial Thinning	One-pass volume recoveries of 50 m^3/ha and 70 m^3/ha for stands up to 20 years before the minimum harvest age were examined for the main TSA. This scenario improves adjacency constraints and available harvest at the minimum harvest age.	Improved timber availability in short- and mid-term by up to 43%.
Combination Scenarios	Combination scenarios were examined, such as reductions in regeneration delay combined with reduced green-up age and later commercial thinning.	Some treatment combinations can be additive, such as juvenile spacing and fertilization, but combination treatment results need further investigation.

Table 6. Effects of silviculture scenarios on timber supply by volume and percent increase (Inland Timber Management, 2000)

Silviculture Scenario	Volume Increase(m3/year)	% Increase
Plant with genetically improved stock	126,990	5.25
Rehabilitate repressed lodgepole pine	35,800	1.45
Reduce netdowns due to future roads	23,000	0.95
Reduce green-up timelines by five years	19,000	0.62
Fertilize to increase volume by 15m^3/ha	8,800	0.33
Immediate elimination of backlog NSR	2,000	0.1
Eliminate backlog NSR within 5 years	< 2,000	< 0.1
Use alternate spacing densities	0	0

Table 7 provides all analysis results for the Williams Lake main TSA (excluding the three western supply blocks) and Table 8 covers similar analysis results specifically for the three western supply blocks.

Tables 9 and 10 are the treatment summary tables extracted from the Type 2 forest level analysis report (Inland Timber Management, 2000) for the main TSA and the three western supply blocks, respectively.

Table 7. All analysis results, Williams Lake main TSA (Timberline, 1999).

Scenario	SHORT TERM								MID TERM		LONG TERM	
	Decade1		Decade2		Decade3		Decade 4		Decades 5-9		Decade 10+	
	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case
Base Case	2670	n/a	2399	n/a	2155	n/a	1936	n/a	1861	n/a	1971	n/a
OGSI Adjustments	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	2416	22.6%
Reduced Time to Regenerate Backlog NSR	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	2011	2.0%
Reduced Regen Delay Reduced by 2 yrs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1891	1.6%	2011	2.0%
Reduced Regen Delay Reduced to 0	2670	0.0%	2399	0.0%	2155	0.0%	1946	0.5%	1946	4.6%	2066	4.8%
Utilization of Cedar PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	1971	0.0%
Utilization of 25 % of Balsam PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1886	1.3%	1986	0.8%
Utilization of 50 % of Balsam PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1901	2.1%	1986	0.8%
Utilization of 100 % of Balsam PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1946	0.5%	1946	4.6%	2001	1.5%
Utilization of 100% of Douglas fir PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	1971	0.0%
Utilization of 25 % of Spruce PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1871	0.5%	1976	0.3%
Utilization of 50 % of Spruce PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1876	0.8%	1981	0.5%
Utilization of 100 % of Spruce PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1891	1.6%	1986	0.8%
Utilization of 25 % of Lodgepole pine PFTs	2670	0.0%	2399	0.0%	2155	0.0%	1996	3.1%	1996	7.3%	1926	-2.3%
Utilization of 50 % of Lodgepole pine PFTs	2670	0.0%	2399	0.0%	2155	0.0%	2151	11.1%	2151	15.6%	1971	0.0%
Utilization of 100 % of Lodgepole pine PFTs	2670	0.0%	2451	2.2%	2451	13.7%	2451	26.6%	2451	31.7%	2011	2.0%
Alternative Spacing Intensities 6000 ha/yr	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	1996	1.3%
Alternative Spacing Intensities 12000 ha/yr	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	2011	2.0%
Alternative Spacing Intensities 18000 ha/yr	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	2041	3.6%
Commercial Thinning 50 m3/ha 1000 ha/yr + Reduced ages	2670	0.0%	2670	11.3%	2670	23.9%	2399	23.9%	1980	6.4%	1995 (14+)	1.2%
Commercial Thinning 50 m3/ha 2400 ha/yr + Reduced ages	2670	0.0%	2670	11.3%	2670	23.9%	2670	37.9%	2670	43.5%	1971 (14+)	0.0%
Commercial Thinning 70 m3/ha 1000 ha/yr + Reduced ages	2670	0.0%	2670	11.3%	2670	23.9%	2399	23.9%	1971	5.9%	1971 (14+)	0.0%
Commercial Thinning 70 m3/ha 2400 ha/yr + Reduced ages	2670	0.0%	2670	11.3%	2670	23.9%	2670	37.9%	2670	43.5%	1971 (12+)	0.0%
Commercial Thinning 70 m3/ha 1000 ha/yr + No regen delay	2670	0.0%	2670	11.3%	2670	23.9%	2399	23.9%	2066	11.0%	2066	4.8%
Road Reductions (reduced by 1%)	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	1996	1.3%
Road Reductions (reduced by 2%)	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1861	0.0%	2011	2.0%
Fertilization of Managed Stands	2670	0.0%	2399	0.0%	2155	0.0%	1936	0.0%	1866	0.3%	2046	3.8%
Reduction in Minimum Harvest Ages	2670	0.0%	2399	0.0%	2155	0.0%	1951	0.8%	1951	4.8%	2066	4.8%
Genetically Improved Stock	2670	0.0%	2399	0.0%	2155	0.0%	1951	0.8%	1951	4.8%	2195	11.4%

Table 8. All analysis results, three western supply blocks, Williams Lake TSA (Timberline, 1999)

	SHORT TERM								MID TERM		LONG TERM	
	Decade1		Decade2		Decade3		Decade 4		Decades 5-9		Decade 10+	
Scenario	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case	Harvest (000's m3/ha)	Change from base case
Base Case	425	n/a	381	n/a	341	n/a	315	n/a	315	n/a	297	n/a
OGSI Adjustments	425	0.0%	381	0.0%	341	0.0%	315	0.0%	315	0.0%	321	8.1%
Reduced Time to Regenerate Backlog NSR	425	0.0%	381	0.0%	341	0.0%	323	2.5%	323	2.5%	302	1.7%
Reduced Regen Delay Reduced by 2 yrs	425	0.0%	381	0.0%	341	0.0%	320	1.6%	320	1.6%	300	1.0%
Reduced Regen Delay Reduced to 0	425	0.0%	381	0.0%	341	0.0%	332	5.4%	332	5.4%	308	3.7%
Utilization of 25 % of Cedar PFTs	425	0.0%	381	0.0%	341	0.0%	317	0.6%	317	0.6%	299	0.7%
Utilization of 50 % of Cedar PFTs	425	0.0%	381	0.0%	341	0.0%	319	1.3%	319	1.3%	300	1.0%
Utilization of 100 % of Cedar PFTs	425	0.0%	381	0.0%	341	0.0%	323	2.5%	323	2.5%	303	2.0%
Utilization of 100 % of Balsam PFTs	425	0.0%	381	0.0%	341	0.0%	318	1.0%	318	1.0%	299	0.7%
Utilization of 25 % of Douglas fir PFTs	425	0.0%	381	0.0%	341	0.0%	317	0.6%	317	0.6%	298	0.3%
Utilization of 50 % of Douglas fir PFTs	425	0.0%	381	0.0%	341	0.0%	320	1.6%	320	1.6%	299	0.7%
Utilization of 100 % of Douglas fir PFTs	425	0.0%	381	0.0%	341	0.0%	325	3.2%	325	3.2%	303	2.0%
Utilization of 25 % of Spruce PFTs	425	0.0%	381	0.0%	341	0.0%	322	2.2%	322	2.2%	303	2.0%
Utilization of 50 % of Spruce PFTs	425	0.0%	381	0.0%	341	0.0%	328	4.1%	328	4.1%	304	2.4%
Utilization of 100 % of Spruce PFTs	425	0.0%	381	0.0%	342	0.2%	342	8.6%	342	8.6%	305	2.7%
Utilization of 25 % of Lodgepole pine PFTs	425	0.0%	428	12.3%	428	25.5%	428	35.9%	428	35.9%	321	8.1%
Utilization of 50 % of Lodgepole pine PFTs	540	27.1%	484	27.0%	434	27.3%	389	23.5%	367	16.5%	367	23.6%
Utilization of 100 % of Lodgepole pine PFTs	766	80.2%	687	80.3%	617	80.9%	554	75.9%	497	57.8%	452	52.2%
Spacing 100 % of Eligible stands	425	0.0%	381	0.0%	341	0.0%	315	0.0%	315	0.0%	298	0.3%
Road Reductions (reduced by 1%)	425	0.0%	381	0.0%	341	0.0%	315	0.0%	315	0.0%	300	1.0%
Road Reductions (reduced by 2%)	425	0.0%	381	0.0%	341	0.0%	315	0.0%	315	0.0%	301	1.3%

Table 9. Treatment summary table for the Williams Lake main TSA (Inland Timber Management, 2000)

MAIN TSA				Timber Supply Impacts		Impacts to Other Land Uses?					
Regime	Objective	Target Stand Description	Response Timeframe	Vol. Increase (000's m3\yr)	% Vol. In-crease	OG	Wild-life	Visuals	Estimated Treatment Area	Estimated Cost/ha	Estimated Jobs (person-days/ha)
OGSI Adjustment	Accurately define site productivity	Pli, Sx >140 ICH,ESSF, MS,SBS	Short - Mid Long	321	13.3	Y	N	N	n/a		
SIBEC Adjustment	Accurately define site productivity	All sites: assumed site series 1.	Short - Mid Long	641	26.5	Y	N	N	n/a		
Pli Rehabilitation	Increase THLB, increase site productivity	Repressed Pli SI <7	Mid - Long	35	1.45	N	N	N	10,000 ha (available area)*	1250	5
Fertilization	Increase site productivity, reduce rotation	Pli, SI >18	Mid - Long	8.8	0.33	N	N	Y	1200 ha/yr	295	1
Plant Genetically Improved Stock	Reduce rotation length, reduce green-up age	All planted sites 12% volume gain	Mid - Long	127	5.25				2000 ha/yr	40	n/a
Greenup Age Reduction	alleviate adjacency, reduce rotation	all managed stands, reduce by 5 yrs.	Short - Mid	19	0.62	Y	N	Y	n/a		n/a
Decrease Future Roads	Increase THLB		Short	23	0.95	N	N	N	reduce area by 2%		n/a
Backlog NSR	Alleviate adjacency, increase productivity	all backlog NSR sites	Mid- Long	2	0.10	N	N	N	1000 ha/yr	1000	1.5
Juvenile Spacing	Increase productivity, prep for CT/PC	% of AU as per Base Case 12-1800 sph	Mid - Long	0	0	N	N	N	6000 ha/yr	550	4.5
Partial Cutting/ Commercial Thin.	Alleviate adjacency, biodiversity issues and habitat supply	various	Short - Mid - Long	Not Tested	Not Tested	Y	Y	Y	further assessment required		2.5

Table 10. Treatment summary table for the Williams Lake TSA three western supply blocks (Inland Timber Management, 2000)

THREE WESTERN SUPPLY BLOCKS				Timber Supply Impacts		Impacts to Other Land Uses?					
Regime	Objective	Target Stand Description	Response Timeframe	Vol. Increase (000's m3\yr)	% Vol In-crease	OG	Wild-life	Visuals	Estimated Treatment Area	Estimated Cost/ha	Estimated Jobs (person-days/ha)
OGSI Adjustment	Accurately define site productivity	Pli, Sx >140 ICH,ESSF, MS,SBS	Short - Mid Long	170	31	Y	N	N	n/a		
SIBEC Adjustment	Accurately define Site productivity	All sites: assumed site series 1.	Short - Mid Long	309	56	Y	N	N	n/a		
Pli Rehab	Increase THLB, increase site productivity	Repressed Pli SI <7	Mid - Long	137	2.5	N	N	N	20,000 (available area)*	1250	5
Greenup Age Reduction	alleviate adjacency, reduce rotation	all managed stands, reduce by 5 yrs	Short - Mid	3	0.55	Y	N	Y	n/a	n/a	n/a
Decrease Future Roads	Increase THLB		Short	7.2	1.3	N	N	N	n/a	n/a	n/a
Juvenile Spacing	Increase productivity,	% of AU, as per base case, target 1200 - 1800 sph.	Mid-Long	0	0	N	N	N	2000 (available area)*	600	4.5

* Although this area is silviculturally suitable for treatment, economic feasibility to complete this level of treatment in the three western supply blocks may be limited.

4.4. Opportunities to Increase Timber Quality

Pruning is well documented as a treatment to improve timber quality (BC Ministry of Forests, date unknown; Barber, 1997). Other technical sources include the Technical Background Information, Timber Enhancement Strategy report, prepared by the Cariboo Lumber Manufacturers' Association (1997), which summarizes technical information on silviculture treatment benefits. The report lists pruning of young stands as a means to improve stem quality and log value at harvest. Stands most eligible for pruning have a high site index, developed access and close proximity to manufacturing facilities.

Operational pruning in the Williams Lake TSA to date, however, has raised concerns due to questionable cost-effectiveness and measured decreases in height growth when live branches are pruned. Consequently, pruning is expected to remain a low priority treatment for the TSA for some time.

4.5. Williams Lake TSA Sustainable Harvest Data

4.5.1. Enhanced Forestry Table

Williams Lake TSA Summary
Enhanced Forestry Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Stand Tending	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	4400	3395	2890	2385	2380	31.68	139400	
Spacing	2468	2547	2727	2717	2949	484.64	1196100	
Pruning	0	0	0	0	0	0.00	0	
Fertilizing	300	300	300	300	300	424.99	127500	
Other	70	70	70	70	70	571.36	40000	
Totals hectares	7238	6312	5987	5472	5699	207.65	1,503,000	
Planning and prescriptions							116800	
Total dollars							1,619,800	
Forest Health Enhancement								
Spacing	0	0	0	0	0	0.00	0	
Pruning	0	0	0	0	0	0.00	0	
Other treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Habitat Supply and Biodiversity Enhancement								
Riparian treatments	20	20	20	20	20	499.75	10000	
Non-riparian treatments	0	0	0	0	0	0.00	0	
Totals hectares	20	20	20	20	20	499.45	10,000	
Domestic Range								
Treatments	0	0	0	0	0	0.00	0	
Enhanced Forestry Activities - Management Unit Total								
Surveys	4400	3395	2890	2385	2380	31.68	139,400	
Spacing	2468	2547	2727	2717	2949	484.64	1,196,100	
Pruning	0	0	0	0	0	0.00	0	
Fertilizing	300	300	300	300	300	424.99	127,500	
Other stand tending activities	90	90	90	90	90	555.22	50000	
Totals hectares	7258	6242	5917	5402	5629	208.46	1,513,000	
Planning and prescriptions							116,800	
SIA, TESC and West Fraser Root Rot Studies							291,753	
Total dollars							1,921,553	

4.5.2. Backlog Program Table

Williams Lake TSA Summary
Backlog Program Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Legal Obligations	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	10500	3000	1600	800	800	24.29	255000	
Site preparation	20	0	0	0	0	499.78	10000	
Planting	140	10	0	0	0	634.25	88800	
Brushing	250	10	0	0	0	487.99	122000	
Max. density spacing	150	50	50	50	50	533.31	80000	
Totals hectares	11060	3070	1650	850	850	50.25	555,800	
Seed purchase	84000	12000	0	0	0	0.28	23520	
Total legal obligations							579,320	
Backlog Reforestation								
Surveys	5019	3970	4119	4099	4079	28.83	144700	
Site preparation	40	20	5	0	0	499.90	20000	
Planting	414	450	320	90	90	733.52	303533	
Brushing	1292	1019	694	693	693	634.38	819500	
Totals hectares	6765	5459	5138	4882	4862	190.36	1,287,733	
Seed purchase	497010	148000	46000	0	0	0.26	127747	
Prescriptions and planning dollars							50400	
Total backlog reforestation							1,465,880	
Impeded areas								
Surveys	1765	1965	1800	1800	1800	31.16	55000	
Brushing	795	655	630	630	630	505.03	401500	
Density spacing	270	270	170	170	70	599.98	162000	
Totals hectares	2830	2890	2600	2600	2500	218.55	618,500	
Prescriptions and planning dollars							57300	
Total impeded areas							675,800	
Site Restoration								
Fill planting	25	25	0	0	0	399.82	10000	
Rehabilitation	180	230	180	180	180	1,066.63	192000	
Reforestation	70	70	70	70	70	539.93	37800	
Totals hectares	275	325	250	250	250	871.92	239,800	
Seed purchase	104000	92000	72000	72000	72000	0.30	31520	
Prescriptions and planning dollars							27800	
Total site restoration							299,120	
Backlog Program Activities - Management Unit Total								
Surveys	17284	8935	7519	6699	6679	26.31	454700	
Site preparation	240	250	185	180	180	924.91	222000	
Planting	649	555	390	160	160	678.35	440133	
Brushing	2337	1684	1324	1323	1323	574.71	1343000	
Density spacing	420	320	220	220	120	576.17	242000	
Totals hectares	20930	11744	9638	8582	8462	129.09	2701833	
Seed purchase	685010	252000	118000	72000	72000	0.27	182787	
Prescriptions and planning							135,500	
Recommended studies							0	
Total backlog program							3,020,120	

* Seed purchase includes seedlings purchase. Units are number of seedlings, or specify.

4.5.3. *Performance Measures Based on Activities Planned for 2002/2003*

Williams Lake TSA Summary
Performance Measures Based on Activities Planned for 2002/2003
Based on Type 2 Silviculture Strategy

	Performance Measure	Tree Improve-ment	Nursery Seedling Production	Silv. Survey	Site prep.	Backlog Plant	Brush	Space	Prune	Fertilize	Support Staff and Admin	Totals
	Inputs											
A	**Planned treatment area (ha) in 2002/2003**	649	0	7,156	240	649	2,337	2,888	0	300	14,308	
1.0	**Timber Supply**											
1.1	Potential volume/ha gain (m3/ha/yr)	0.41	0	0	0	2.9	0.41	0.25	0	0.40		
1.2	Years the factor will apply	80	65	65	80	80	65	65	65	65		
1.3	Pot. total merch. volume increment in 65 years (m3)	21,282	0	0	0	152,605	62,276	46,930	0	7,800		**290,893**
1.4	Est. yrs reduced to achieve management objectives	5-10	1-3	5-10	0	5-20	5	5-30	0	5-10		
1.4	Est. area that will be reclassified as stocked (ha)			1,671								**1,671**
1.5	Est. area that will be declared as free growing (ha)			2,571								**2,571**
2.0	**Wood Value**											
2.1	Percent improvement in total value at harvest (Compared to no treatment)							5-15%	15-30%	1-5%		
3.0	**Employment**											
3.1	Estimated short term employment (person days/ha)	0.1	0.34	0.1	0.95	2	2.61	3.96	4.54	0.18	0.1	
3.2	Estimated total employment (person days/year)	65	0	716	228	1,298	6,099	11,437	0	54	1,431	
3.3	Estimated total full time equivalent positions (FTE)	0	0	4	1	7	34	64	0	0	8	**118**
4.1	**Forest Health Enhancement (ha)**											**0**
5.1	**Habitat Supply**											
5.2	Planned area for specific wildlife forage or habitat maintenance in 2002/2003 (ha)											**20**
5.3	Est. area with secondary value provided to biodiversity (ha)											**0**

4.5.4. Studies Table

See section 8 Cariboo Region Special Studies Summary

4.5.5. *Williams Lake TSA Summary Table*

Williams Lake TSA Summary
Management Unit Summary Table
For the 2002/03 Fiscal Year

	Treatment Area Goals (ha)					Plan 2002/03	
	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)
Enhanced Forestry Program Field Activities	7,258	6,242	5,917	5,402	5,629	208	1,513,000
Planning, prescriptions and seedlings							408,553
Backlog Program Field Activities	20,930	0	0	0	0	129	2,701,833
Planning, prescriptions and seedlings							318,287
Totals	28,188	6,242	5,917	5,402	5,629		4,941,673

Performance Measures

Potential total merchantable volume increment in 65 years	290,893 m^3
Estimated ha that will be reclassified as stocked	1,671 ha
Estimated ha that will be declared as free growing	2,571 ha
Estimated total full time equivalent positions generated	118 FTEs
Forest health enhancement area	0 ha
Planned area for specific wildlife forage or habitat maintenance	20 ha
Estimated area with secondary value provided to biodiversity	0 ha

5. 100 Mile House TSA Sustainable Harvest Outline

5.1. Basic Data

The 100 Mile House Timber Supply Area is the most southern of the three TSAs in the Cariboo Forest Region, located in the central interior of British Columbia. The area occupies a section of the Fraser Basin and Interior Plateau between the Fraser River and Quesnel Highland to the east (BC Ministry of Forests, no date). The TSA's climate is dry and cold in the west due to the rain shadow influence of the Coast Mountains, and milder and wetter where airflow rises to the east, with a very dry and warm Fraser River valley bisecting the TSA. Extensive grassland and wetland areas and rolling topography are other key features of the area.

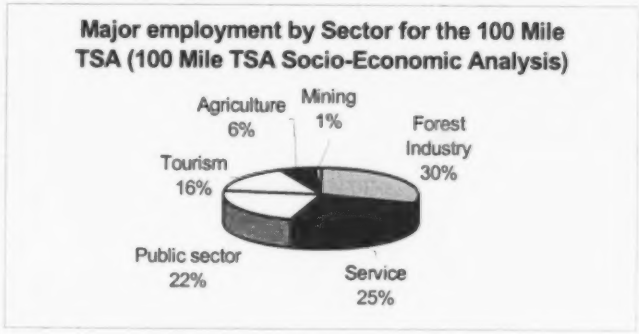
Major employment by Sector for the 100 Mile TSA (100 Mile TSA Socio-Economic Analysis)
Agriculture 6%
Mining 1%
Forest Industry 30%
Tourism 16%
Public sector 22%
Service 25%

Figure 5. Major employment by sector for the 100 Mile House TSA.

The predominant community in the 100 Mile House Timber Supply Area is the regional municipality of 100 Mile House, with the village of Clinton located in the south end of the TSA. The TSA extends east and west of these central communities located on Highway 97. Wells-Gray Provincial Park forms the TSA's eastern boundary; the western boundary is the Fraser River. There are two First Nations Bands and one association which reside primarily in the TSA, the Canim Lake and High Bar Bands. Another eight bands have territorial claims to the area. The TSA covers 1.2 million ha with approximately 77% as productive Crown forest (BC Ministry of Forests, date unknown). Deductions to the productive forest landbase reduce the current harvesting landbase to 718,429 ha, or 59% of the total landbase.

Figure 5 provides a summary of major employment by sector, and Figure 6 shows the age class distribution for the 100 Mile House TSA.

The allowable annual cut has been affected for the last 20 years by outbreaks of mountain pine beetle and the need for beetle control and salvage harvesting. The current AAC of 1,362,000 m^3, set in 1995, is comprised of four components:

- TSA clearcut
- Drybelt Douglas-fir selection harvesting
- Mule Deer Winter Range (MDWR) selection harvesting
- Pulpwood Agreement #16 (PA16)

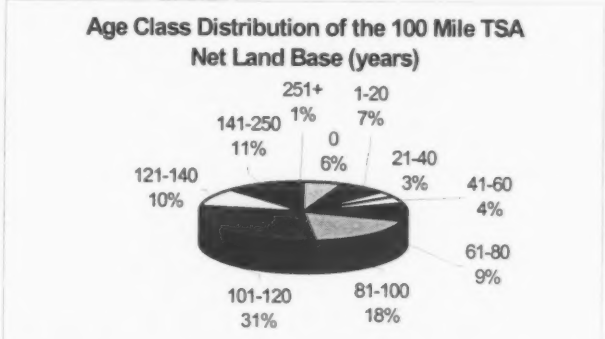

Figure 6. Age class distribution of the 100 Mile House TSA.

The second Timber Supply Review (TSR2) is in the process of being compiled in the 100 Mile House TSA. The harvest schedule used by Timberline (1998b) for the Stand Treatments Analysis initially examined various timber harvest flow alternatives. An "even flow" schedule was selected to provide the optimal supply of timber over the long term. The total annual harvest levels incorporate an even flow clearcut portion of 1,291,000 m^3 and a Pulpwood Agreement 16 cut of 112,000 m^3 annually for the entire 250-year planning horizon. The fluctuating contribution of selection harvest from drybelt Douglas-fir and mule deer winter ranges contributes to a projected total annual harvest of approximately 1.6 million m^3.

5.2. Issues

Table 11 lists 15 issues affecting timber supply from the perspectives of timber quality and quantity, forest health and habitat supply. They are summarized from the TSR1 AAC rationale (Pedersen, 1996c) and TSR2 data package for the 100 Mile TSA, with additional input from MELP staff.

Table 11. Sustainable harvest issues for the 100 Mile House TSA

Issue	Comments
Cariboo-Chilcotin Land Use Plan	The CCLUP was announced by government in October, 1994 and adopted by Cabinet as a Higher Level Plan with later amendment effective July 31, 1999. Management prescriptions contained in the CCLUP strategy reports have been modified by the Integration Report and are considered key information sources in Forest Development Plan direction. The TSR2 process relies on CCLUP information for the modeling of some prescriptions or constraints, which will affect long-term timber supply considerations in the RMP.
Landscape-level biodiversity	Seral stage distribution targets recommended in the *Biodiversity Conservation Strategy* will be used for achieving biodiversity objectives outlined in the CCLUP.
Stand-level biodiversity	Wildlife tree patches are planned to reduce impact on the productive forest area as much as possible.
Pulpwood Agreement #16 timber supply	112,000m^3/year was partitioned in TSR1 for PA #16. These forest types will be segregated for TSR2.
Salvage harvesting for mountain pine beetle and winter 1998/99 ice damage.	New criteria for stands damaged or killed by mountain pine beetle are in use to address biodiversity objectives. Recent increases in salvage requirements, however, may affect short-term harvest levels and longer-term timber supply.
Inventory audit	Updated inventory needed (Vegetation Resources Inventory)
Old Growth Site Index	Current research shows that site indices for stands older than 140 years are below actual productivity. Until regional information is available, the provincial site index adjustments will be applied as a sensitivity analysis in TSR2.
Lignum Innovative Forest Practices Agreement	The IFPA gives Lignum the opportunity to test innovative forestry practices for increasing AAC and implementing successful practices in the TSA.
Goal 2 protected area candidates	Included in TSR2.
Sub-Regional Planning	SRP will refine CCLUP constraints in the TSA, including visually sensitive areas, tourism visuals, wildlife habitat areas, back country recreation and access criteria
Visually sensitive areas	Partial retention was used as the Visual Quality Objective in TSR1, but anticipated tourism pressures may find this to have overestimated the timber supply, particularly in the eastern portion of the TSA.
Wildlife habitat	Mule deer winter range strategy for harvesting in the IDF allows for no harvesting on some ranges with limited selection harvesting and extended rotations on others. Grizzly bear, moose, furbearer, species at risk – implementation strategies for CCLUP requirements to manage for habitat for these species are being developed on an ongoing basis; for enhanced forestry activities, standards for maintaining habitat supply will include considerations for these species.

Issue	Comments
Riparian habitat	The inclusion of riparian reserves and management zones reduces the productive forest land area with potential impact on the availability of mature volume for harvesting.
Green-up	Under discussion and will be refined. Patch size is a related issue.
Community dependence	As shown on page 1 under Basic Data, approximately 1/3rd of total employment in the TSA relies on the forest industry. Public input is most prominent on this socio-economic issue. Future Timber Supply Reviews and AAC determinations will need to balance timber availability with community dependence and opportunities for mitigating projected falldowns with development of alternate economic bases.

5.3. Opportunities to Increase Timber Supply

The Stand Treatments Analysis report for the 100 Mile House TSA (Timberline, 1998b) outlines the methodology used in the timber supply analysis. FSSIM 3.0, a forest-level simulation model, predicted the development of a forest over a 250-year planning horizon based on initial forest conditions, expected patterns of growth, harvesting and regeneration rules, and assumptions for non-timber resources. A list of the analysis options with a brief description of each and its effect on timber supply follows in Table 12 to demonstrate the breadth of scenarios tested and examined.

Table 12. Summary of stand treatment analysis *o*ptions and their effect on timber supply in the 100 Mile House TSA (Timberline, 1998b)

Analysis Option	Description	Effect on Timber Supply
Base Case	The management assumptions, land base netdowns, general growth and yield parameters and forest cover requirements from TSR1 were used, with some minor changes to the development of analysis units to better reflect anticipated TSR2.	The base case even-flow harvest rate of 1,291,000 for the TSA clearcut is 3% above the current AAC of 1,250,000 m^3/year. The TSA clearcut and PA16 harvest levels are stable over time. Some fluctuations exist in selection harvest levels due to the current age class distribution for forests on those areas and the history of past harvesting. The average annual harvest from the TSA component (clearcut, Fdi-selection & MDWR selection) is 1,443,100 m^3/year (net of Non Recoverable Losses) which is 15% higher than the current AAC.
Old Growth Site Index adjustments	OGSI adjustment equations, including SIBEC, were used for interior spruce and lodgepole pine to more accurately assess productivity of stands older than 140 years.	The maximum gain is slightly less than 5% over base case. PA16 and selection areas were not adjusted. The OGSI adjustment on Managed Stand Yield Tables reduces the impact of the critical period 130-150 years into the future because there is more merchantable volume at that time.
Reduced Time to Green-up	Green-up period for the IRM and visual constraint areas was reduced by 3 years, to better reflect stand treatments such as brushing and fertilization that can reduce the time for stands to reach 3 m in height.	The increase over the Base Case + OGSI harvest rate in this scenario is negligible.
Reduced Regeneration Delay	The expected time for stands to become established was reduced by two years.	Decreasing regeneration delay by two years results in an increase in the annual harvest rate of approximately 2%.

Analysis Option	Description	Effect on Timber Supply
Genetically Improved Planting Stock	Tree improvement gains of 12% volume increase at rotation were used by adjusting site index with two candidate groups reviewed, lodgepole pine included and excluded.	Inclusion of pine increases periodic harvest by 12%. However, results may be too optimistic because of the assumption that all future pine stands will be regenerated by planting, compared with only 10% in base case. If genetic gains are applied only to Douglas–fir and spruce stands, the gain is 3%.
Alternative Spacing Densities	Pine and spruce densities were increased to 3600 and Douglas-fir to 3000 stems/hectare. Pine and spruce were decreased to 1200 and Douglas-fir to 1000 stems/ha.	Increased densities reduce harvest rate by 1%. Decreased densities reduce harvest rate by 3%.
Fertilization and Spacing	Volume of all eligible lodgepole pine managed stands was increased by 15 m^3/ha at rotation to reflect gains from one fertilization treatment.	Impact of fertilizing only good site pine is minimal, <0.5%. Fertilizing good and medium site pine increases annual harvest rate by 3%, and the average gain in volume by 5% over Base Case + OGSI scenario.

The majority of annual harvest adjustments related to the various treatments were associated with the TSA clearcut portion of the landbase.

5.4. Opportunities to Increase Timber Quality

Pruning is well documented as a treatment to improve timber quality (BC Ministry of Forests, date unknown; Barber, 1997). Other technical sources include the Technical Background Information, Timber Enhancement Strategy report, prepared by the Cariboo Lumber Manufacturers' Association (1997), which summarizes technical information on silviculture treatment benefits. The report lists pruning of young stands as a means to improve stem quality and log value at harvest. Stands most eligible for pruning have a high site index, developed access and close proximity to manufacturing facilities.

Growth rates expected in various ecosystems within the 100 Mile TSA indicate that pruning is only viable in the more productive subzones. Operational pruning in the 100 Mile House TSA has not been conducted to date. Pruning is expected to remain a low priority treatment in the TSA for some time.

5.5. 100 Mile House TSA Sustainable Harvest Data

5.5.1. Enhanced Forestry Table

100 Mile House TSA Summary
Enhanced Forestry Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Stand Tending	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	400	400	400	400	400	28.00	11200	
Spacing	645	650	650	650	650	558.14	360000	
Pruning	0	0	0	0	0	0.00	0	
Fertilizing	0	0	0	0	0	106.25	0	
Other	50	50	50	50	50	499.97	25000	
Totals hectares	1095	1100	1100	1100	1100	361.82	396,200	
Planning and prescriptions							36000	
Total dollars							432,200	
Forest Health Enhancement								
Spacing	65	65	65	65	65	569.21	37000	
Pruning	0	0	0	0	0	0.00	0	
Other treatments	10	0	0	0	0	5,998.20	60000	
Totals hectares	75	65	65	65	65	1,293.18	97,000	
Habitat Supply and Biodiversity Enhancement								
Riparian treatments	10	10	10	10	10	599.82	6000	
Non-riparian treatments	0	0	0	0	0	0.00	0	
Totals hectares	10	10	10	10	10	599.58	6,000	
Domestic Range								
Treatments	0	0	0	0	0	0.00	0	
Enhanced Forestry Activities - Management Unit Total								
Surveys	400	400	400	400	400	28.00	11,200	
Spacing	710	715	715	715	715	559.15	397,000	
Pruning	0	0	0	0	0	0.00	0	
Fertilizing	0	0	0	0	0	106.25	0	
Other stand tending activities	70	60	60	60	60	1,299.68	91000	
Totals hectares	1180	1115	1115	1115	1115	423.04	499,200	
Planning and prescriptions							36,000	
Studies funding							115150	
Total dollars							650,350	

5.5.2. Backlog Program Table

100 Mile House TSA Summary
Backlog Program Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Legal Obligations	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	4221	4057	2202	2043	2000	27.95	118000	
Site preparation	20	20	20	10	10	649.94	13000	
Planting	70	70	70	30	30	479.99	33600	
Brushing	534	200	238	200	200	314.72	168000	
Max. density spacing	35	0	0	0	0	0.00	0	
Totals hectares	4880	4347	2531	2283	2240	68.15	332,600	
Seed purchase	73000	73000	73000	73000	73000	0.26	18940	
Total legal obligations							351,540	
Backlog Reforestation								
Surveys	6162	4313	4907	5553	4200	20.45	126000	
Site preparation	163	60	70	70	70	107.69	17500	
Planting	298	157	102	102	102	194.50	58000	
Brushing	963	499	388	423	388	226.38	218000	
Totals hectares	7586	5029	5467	6148	4760	55.30	419,500	
Seed purchase	118400	118400	120400	120400	120400	0.25	30120	
Prescriptions and planning dollars							97700	
Total backlog reforestation							547,320	
Impeded areas								
Surveys	11283	5432	3727	1764	0	0.00	0	
Brushing	2523	336	401	147	110	22.30	56250	
Density spacing	5765	673	102	20	20	2.08	12000	
Totals hectares	19571	6441	4230	1931	130	3.49	68,250	
Prescriptions and planning dollars							33000	
Total impeded areas							101,250	
Site Restoration								
Fill planting	0	0	0	0	0	0.00	0	
Rehabilitation	10	10	10	10	10	2,499.25	25000	
Reforestation	10	10	10	10	10	539.84	5400	
Totals hectares	20	20	20	20	20	1,519.24	30,400	
Seed purchase	12000	12000	12000	12000	12000	0.28	3360	
Prescriptions and planning dollars							4000	
Total site restoration							37,760	
Backlog Program Activities - Management Unit Total								
Surveys	21666	13801	10836	9360	6200	11.26	244000	
Site preparation	193	90	100	90	90	288.30	55500	
Planting	378	237	182	142	142	256.47	97000	
Brushing	4020	1035	1027	770	698	110.02	442250	
Density spacing	5800	673	102	20	20	2.07	12000	
Totals hectares	32057	15836	12247	10382	7150	26.54	850750	
Seed purchase	203400	203400	205400	205400	205400	0.26	52420	
Prescriptions and planning							134,700	
Recommended studies							0	
Total backlog program							1,037,870	

* Seed purchase includes seedlings purchase. Units are number of seedlings, or specify.

5.5.3. Performance Measures Based on Activities Planned for 2002/2003

100 Mile House TSA Summary
Performance Measures Based on Activities Planned for 2002/2003
Based on Type 2 Silviculture Strategy

	Performance Measure	Tree Improve-ment	Nursery Seedling Production	Silv. Survey	Site prep.	Backlog Plant	Brush	Space	Prune	Fertilize	Support staff and admin	Totals
	Inputs											
A	**Planned treatment area (ha) in 2002/2003**	378	0	7,282	193	378	4,020	6,510	0	0	18,831	
1.0	**Timber Supply**											
1.1	Potential volume/ha gain (m3/ha/yr)	0.41	0	0	0	2.9	0.41	0.25	0	0.40		
1.2	Years the factor will apply	80	65	65	80	80	65	65	65	65		
1.3	Pot. total merch. volume increment in 65 years (m3)	12,405	0	0	0	88,955	107,125	105,792	0	0		**314,278**
1.4	Est. yrs reduced to achieve management objectives	5-10	1-3	5-10	0	5-20	5	5-30	0	5-10		
1.4	Est. area that will be reclassified as stocked (ha)			760								**760**
1.5	Est. area that will be declared as free growing (ha)			2,270								**2,270**
2.0	**Wood Value**											
2.1	Percent improvement in total value at harvest (Compared to no treatmer							5-15%	15-30%	1-5%		
3.0	**Employment**											
3.1	Estimated short term employment (person days/ha)	0.1	0.34	0.1	0.95	2	2.61	3.96	4.54	0.18	0.1	
3.2	Estimated total employment (person days/year)	38	0	728	183	756	10,491	25,781	0	0	1,883	
3.3	Estimated total full time equivalent positions (FTE)	0	0	4	1	4	58	143	0	0	10	**221**
4.1	**Forest Health Enhancement (ha)**											**75**
5.1	**Habitat Supply**											
5.2	Planned area for specific wildlife forage or habitat maintenance in 2002/2003 (ha)											**10**
5.3	Est. area with secondary value provided to biodiversity (ha)											**0**

5.5.4. Studies Table

See section 8 Cariboo Region Special Studies Summary

5.5.5. 100 Mile House TSA Summary Table

100 Mile House TSA Summary

Management Unit Summary Table

For the 2002/03 Fiscal Year

	Treatment Area Goals (ha)					Plan 2002/03	
	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)
Enhanced Forestry Program Field Activities	1,180	1,115	1,115	1,115	1,115	423	499,200
Planning, prescriptions and seedlings							151,150
Backlog Program Field Activities	32,057	0	0	0	0	27	850,750
Planning, prescriptions and seedlings							187,120
Totals	33,237	1,115	1,115	1,115	1,115		1,688,220

Performance Measures

Potential total merchantable volume increment in 65 years	314,278 m^3
Estimated ha that will be reclassified as stocked	760 ha
Estimated ha that will be declared as free growing	2,270 ha
Estimated total full time equivalent positions generated	221 FTEs
Forest health enhancement area	75 ha
Planned area for specific wildlife forage or habitat maintenance	10 ha
Estimated area with secondary value provided to biodiversity	0 ha

6. TFL 5 Sustainable Harvest Outline[1]

6.1. Basic Data

TFL 5 is located at the north end of the Quesnel Forest District. Weldwood of Canada Ltd. carries out forestry operations and general management of TFL 5. This tree farm was first awarded in 1951 to Western Plywood Ltd., the predecessor of Weldwood of Canada Ltd. Since 1951, nine Management and Working Plans have guided resource development activities on TFL 5. Programs undertaken since 1985 that have influenced resource management activities include:

- Forest cover inventory
- Fish, Forest and Wildlife Plan
- Biogeoclimatic Ecosystem Mapping
- Creation of Managed Stand Yield Tables specific for TFL 5
- A 10-Year incremental silviculture program (completed in 1995)
- Analysis into the effects of white pine weevil (ongoing)

6.2. Issues

6.2.1. Timber Issues

Silviculture activities are expected to play an important role in the future timber supply of the TFL. Perhaps, just as importantly, these activities will also have a significant effect on timber quality.

Weldwood's AAC apportionments within the Quesnel TSA are currently secured through long-term tenure with TFL 5 and replaceable Forest Licenses in the Quesnel and Prince George Forest Districts. These tenures comprise a total annual volume of approximately 611,000 m^3/year. Since this is only 67% of the total volume that the plywood mill and the sawmill can utilize under full operating capacity, the shortfall must therefore be addressed through private wood purchases.

Premium sawlogs are of very high demand in Weldwood's manufacturing facilities. These facilities have a throughput requirement requiring that approximately 50-55% of the logs processed be of premium sawlog/peeler grades. To offset the shortfall in quality that currently exists, aggressive log trades are made with other Quesnel and Prince George licensees. Also, as the combined AACs are unable to meet the operating capacity of the two plants, private purchases of as much as 400,000 m^3 are made annually. Weldwood recognizes that current basic silviculture practices and reduced rotation ages will have a negative affect on premium sawlog supplies. Weldwood also recognizes that the high quality growing sites occurring within TFL 5 would be well suited to silviculture regimes geared to produce premium grade sawlogs.

As a result of these quality and quantity issues, silviculture activities are very important in overall strategic management considerations. Within the next 30 to 50 years, an increasing percentage of previously harvested area will be providing second growth forests to support the allowable annual cut. It is forecast that by the year 2050, 60% of the harvest will come from

[1] Extracted from Industrial Forestry Service, 2000.

second growth managed stands. The condition of these stands, both on a volume level and on a quality basis, will play a critical role in the future opportunities that are available to Weldwood.

6.2.2. Habitat Issues

Approximately 70% of TFL 5 is found within the Lower Blackwater Special Resource Development Zone (SRDZ), as identified in CCLUP. The CCLUP has identified this area as having high wildlife values, for mule deer winter range, in particular. The mule deer winter range issues were largely resolved in 1995 with a Fish, Forest and Wildlife Management Plan completed for TFL 5 by Keystone Wildlife Research. Management constraints designed to regulate mule deer habitat were incorporated into the 1997 Timber Supply Analysis for TFL 5.

Discussions relating to various incremental silviculture activities that may be pursued on TFL 5 in the future were not a concern as a habitat issue. Most of these activities would likely lend themselves to an increased diversity of habitat throughout TFL 5.

6.2.3. Employment Issues

Within the Quesnel Forest District, TFL 5 contributes only a very small part of the total harvest (approximately 5%). TFL 5's current AAC supports approximately 15% of the workers employed in the Weldwood sawmill and plywood mill in Quesnel. There are no major issues regarding employment other than the general goal of not reducing the current AAC. The timber supply analysis showed that a reduction in the future AAC is unlikely given current management assumptions.

6.3. Opportunities to Increase Timber Supply

Opportunities to increase timber supply for TFL 5 are shown in Table 13. Weldwood is currently undergoing a type two strategic silviculture analysis which is expected to be complete in 2001. Additional opportunities may be identified in this analysis.

Table 13. Potential strategies by timeframe for TFL 5 (Industrial Forestry Service, 2000)

Response Timeframe	Objective/Action	Anticipated Result
Short Term	1. OAF survey 2. Ensure future managed stand voids are at a maximum of 10% (i.e. OAF1)	1. If the survey identifies that the OAF 1 of 15% for the TFL overestimates the forecast losses to openings in managed stands, the managed stands which will be harvested in 50-60 years will experience in increase in yield of as much as 5-10% 2 ±1 % on managed stand curves
Mid Term	1. OAF survey 2 Utilize better genetic gain information 3. Reduce harvest age 4. Remove OG constraint in IRM zone 5. Commercial Thinning 6. Purchase private land to fill hole in age class profile in 50 years	1 ±5 % on managed stand curves 2. ±5% on managed stand curves 3. +5% short/mid term impact (negative effect [-7%] in the long term due to harvesting at below culmination age) 4. estimated + 1% increase 5. estimated +2% as a result of a shift in the scheduling of available volume 6. Area multiplied by an MAI of 4 would provide a thumb-nail impact. Weldwood began this strategy in mid 1990s.
Long Term	1. Reduce regeneration delay to 0 yrs. 2. Space/fertilize future managed stands. 3. Remove OG constraint in IRM zone.	1. + 2.7% increase 2. + 4% 3. + 1%

6.4. *Opportunities to Increase Timber Quality*

The following five strategies are identified in the Type 1 strategy (Industrial Forestry Service, 2000) as most appropriate for implementation on TFL 5 to improve timber quality. Generally, improved timber quality aims to grow premium sawlogs of peeler quality, large-diameter Douglas-fir, with little rot and few tight knots. As above, the type two silviculture analyses may identify additional opportunities to increase timber quality.

- Increase the proportion of Douglas-fir on the TFL to 50% by volume, by planting and giving preference to Douglas-fir in any spacing or conifer release treatments.

- Utilize spacing to:
  - Reduce immature stand densities to optimize both site occupancy and growth per tree to achieve a target diameter at culmination of >35 cm for approximately 50-60% of the stand volume.
  - Set immature stand and plantation densities at levels suitable for pruning so that pruning costs are not prohibitive, and to allow crop tree selection for pruning.
  - Reduce conifer densities and select crop trees accordingly during conifer release treatments such that target diameters can be achieved at rotation and or "set up" for pruning if required.

- Utilize pruning to:
  - Minimize the frequency of knots in, at least, the bottom two logs of each stem (>5.5 m), in spaced stands.
  - Maintain the juvenile wood core in the bottom two logs to 9 cm or less in spaced stands

- Use late rotation fertilization to increase the production of mature wood approximately 10 years before harvest (clear or near clear wood). This should be used in combination with a commercial thin or in other mature or near mature stands with appropriate densities.

- Commercial thin appropriate mature or near mature stands to increase the average diameter of the remaining crop trees and the proportion of premium sawlogs in the residual stand. This should be done on an experimental basis to identify economic factors and stand attributes that will make this treatment successful.

6.5. TFL 5 Sustainable Harvest Data

6.5.1. Enhanced Forestry Table

TFL 5

Enhanced Forestry Table

For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Stand Tending	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	500	500	500	500	500	28.00	14000	
Spacing	0	0	0	0	0	0.00	0	
Pruning	50	50	50	20	20	1200.00	60000	
Fertilizing	400	400	200	200	200	375.00	150000	
Other	0	0	0	0	0	0.00	0	
Totals hectares	950	950	750	720	720	235.79	224,000	
Planning and prescriptions							10,000	
Total dollars							234,000	
Forest Health Enhancement								
Spacing	0	0	0	0	0	0.00	0	
Pruning	0	0	0	0	0	0.00	0	
Other treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Habitat Supply and Biodiversity Enhancement								
Riparian treatments	0	0	0	0	0	0.00	0	
Non-riparian treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Domestic Range								
Treatments	0	0	0	0	0	0.00	0	
Enhanced Forestry Activities - Management Unit Total								
Surveys	500	500	500	500	500	28.00	14,000	
Spacing	0	0	0	0	0	0.00	0	
Pruning	50	50	50	20	20	1,199.98	60,000	
Fertilizing	400	400	200	200	200	375.00	150,000	
Other stand tending activities	0	0	0	0	0	0.00	0	
Totals hectares	950	950	750	720	720	235.79	224,000	
Planning and prescriptions							10,000	
Studies funding							0	
Total dollars							234,000	

6.5.2. Backlog Program Table

TFL 5

Backlog Program Table

For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Legal Obligations	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	0	0	0	0	0	0.00	0	
Site preparation	0	0	0	0	0	0.00	0	
Planting	0	0	0	0	0	0.00	0	
Brushing	0	0	0	0	0	0.00	0	
Max. density spacing	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Seed purchase	0	0	0	0	0	0.00	0	
Total legal obligations							0	
Backlog Reforestation								
Surveys	1800	1000	0	0	0	27.78	50000	
Site preparation	0	0	0	0	0	0.00	0	
Planting	0	0	0	0	0	0.00	0	
Brushing	0	0	0	0	0	0.00	0	
Totals hectares	1800	1000	0	0	0	27.78	50,000	
Seed purchase	0	0	0	0	0	0.00	0	
Prescriptions and planning dollars							6,000	
Total backlog reforestation							56,000	
Impeded areas								
Surveys	0	0	0	0	0	0.00	0	
Brushing	100	100	100	100	100	650.00	65000	
Density spacing	0	0	0	0	0	0.00	0	
Totals hectares	100	100	100	100	100	649.99	65,000	
Prescriptions and planning dollars							0	
Total impeded areas							65,000	
Site Restoration								
Fill planting	0	0	0	0	0	0.00	0	
Rehabilitation	0	0	0	0	0	0.00	0	
Reforestation	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Seed purchase	0	0	0	0	0	0.00	0	
Prescriptions and planning dollars							0	
Total site restoration							0	
Backlog Program Activities - Management Unit Total								
Surveys	1800	1000	0	0	0	27.78	50000	
Site preparation	0	0	0	0	0	0.00	0	
Planting	0	0	0	0	0	0.00	0	
Brushing	100	100	100	100	100	649.99	65000	
Density spacing	0	0	0	0	0	0.00	0	
Totals hectares	1900	1100	100	100	100	60.53	115000	
Seed purchase	0	0	0	0	0	0.00	0	
Prescriptions and planning							6,000	
Recommended studies							0	
Total backlog program							121,000	

* Seed purchase includes seedlings purchase. Units are number of seedlings, or specify.

6.5.3. Performance Measures Based on Activities Planned for 2002/2003

TFL 5
Performance Measures Based on Activities Planned for 2002/2003
Based on Type 1 Silviculture Strategy

	Performance Measure	Tree Improve-ment	Nursery Seedling Production	Silv. Survey	Site prep.	Backlog Plant	Brush	Space	Prune	Fertilize	Support staff and admin	Totals
	Inputs											
A	**Planned treatment area (ha) in 2002/2003**	0	0	759	0	0	100	0	50	400	1,309	
1.0	**Timber Supply**											
1.1	Potential volume/ha gain (m3/ha/yr)	0.41	0	0	0	2.9	0.41	0.25	0	0.40		
1.2	Years the factor will apply	80	65	65	80	80	65	65	65	65		
1.3	Pot. total merch. volume increment in 65 years (m3)	0	0	0	0	1	2,665	0	0	10,400		**13,066**
1.4	Est. yrs reduced to achieve management objectives	5-10	1-3	5-10	0	5-20	5	5-30	0	5-10		
1.4	Est. area that will be reclassified as stocked (ha)			180								**180**
1.5	Est. area that will be declared as free growing (ha)			180								**180**
2.0	**Wood Value**											
2.1	Percent improvement in total value at harvest (Compared to no treatment)							5-15%	15-30%	1-5%		
3.0	**Employment**											
3.1	Estimated short term employment (person days/ha)	0.1	0.34	0.1	0.95	2	2.61	3.96	4.54	0.18	0.1	
3.2	Estimated total employment (person days/year)	0	0	76	0	0	261	0	227	72	131	
3.3	Estimated total full time equivalent positions (FTE)	0	0	0	0	0	1	0	1	0	1	**4**
4.1	**Forest Health Enhancement (ha)**											**0**
5.1	**Habitat Supply**											
5.2	Planned area for specific wildlife forage or habitat maintenance in 2002/2003 (ha)											**0**
5.3	Est. area with secondary value provided to biodiversity (ha)											**0**

6.5.4. Studies Table

See section 8 Cariboo Region Special Studies Summary

6.5.5. TFL 5 Summary Table

TFL 5

Management Unit Summary Table

For the 2002/03 Fiscal Year

	Treatment Area Goals (ha)					Plan 2001/02	
	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	Unit Cost ($/ha)	Funding ($)
Enhanced Forestry Program Field Activities	950	900	900	700	700	173	164,000
Planning, prescriptions and seedlings							10,000
Backlog Program Field Activities	2,750	0	0	0	0	89	245,000
Planning, prescriptions and seedlings							15,000
Totals	3,700	900	900	700	700		434,000

Performance Measures

Potential total merchantable volume increment in 65 years	31,038 m^3
Estimated ha that will be reclassified as stocked	200 ha
Estimated ha that will be declared as free growing	250 ha
Estimated total full time equivalent positions generated	5 FTEs
Forest health enhancement area	0 ha
Planned area for specific wildlife forage or habitat creation	0 ha
Estimated area with secondary value provided to biodiversity	0 ha

7. TFL 52 Sustainable Harvest Outline

7.1. Basic Data

TFL 52 is located east of the community of Quesnel, in the eastern half of the Quesnel Forest District. The licensee is West Fraser Mills Ltd.

7.2. Issues

No information on issues within the TFL have been provided to date. The TFL is currently under going a Type 2 Strategic Silviculture analysis . The results were not available at the time of plan preparation.

7.3. Opportunities to Increase Timber Supply

The TFL is currently under going a Type 2 Strategic Silviculture analysis which may identify opportunities to increase timber supply.

7.4. Opportunities to Increase Timber Quality

The TFL is currently under going a Type 2 Strategic Silviculture analysis which may identify opportunities to increase timber quality.

7.5. TFL 52 Sustainable Harvest Data

7.5.1. Enhanced Forestry Table

TFL 52

Enhanced Forestry Table

For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03		
Stand Tending	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)	Priority
Surveys	750	750	750	750	750	25.50	19125	
Spacing	0	25	25	25	25	1000.00	0	
Pruning	0	20	20	20	20	1000.00	0	
Fertilizing	0	175	175	175	175	350.00	0	
Other	0	0	0	0	0	0.00	0	
Totals hectares	750	970	970	970	970	25.50	19,125	
Planning and prescriptions							10,000	
Total dollars							29,125	
Forest Health Enhancement								
Spacing	0	0	0	0	0	0.00	0	
Pruning	0	0	0	0	0	0.00	0	
Other treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	
Habitat Supply and Biodiversity Enhancement								
Riparian treatments	0	0	0	0	0	0.00	0	
Non-riparian treatments	0	0	0	0	0	0.00	0	
Totals hectares	0	0	0	0	0	0.00	0	

Domestic Range								
Treatments	0	0	0	0	0	0.00	0	

Enhanced Forestry Activities - Management Unit Total								
Surveys	750	750	750	750	750	25.50	19,125	
Spacing	0	25	25	25	25	0.00	0	
Pruning	0	20	20	20	20	0.00	0	
Fertilizing	0	175	175	175	175	350.00	0	
Other stand tending activities	0	0	0	0	0	0.00	0	
Totals hectares	750	970	970	970	970	25.50	19,125	
Planning and prescriptions							10,000	
Studies funding							0	
Total dollars							29,125	

7.5.2. Backlog Program Table

TFL 52 Backlog Program Table
For the 2002/03 Fiscal Year

Activities	Treatment Area Goals (ha)					Plan 2002/03	
Legal Obligations	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)
Surveys	0	0	0	0	0	0.00	0
Site preparation	0	0	0	0	0	0.00	0
Planting	0	0	0	0	0	0.00	0
Brushing	0	0	0	0	0	0.00	0
Max. density spacing	0	0	0	0	0	0.00	0
Totals hectares	0	0	0	0	0	0.00	0
Seed purchase	0	0	0	0	0	0.00	0
Total legal obligations							0
Backlog Reforestation							
Surveys	4000	4000	3400	2800	2200	25.50	102000
Site preparation	78	400	170	140	110	960.00	74880
Planting	250	450	440	190	135	700.00	175000
Brushing	350	350	500	240	200	475.00	166250
Totals hectares	4678	5200	4510	3370	2645	110.76	518,130

Seed purchase	72000	129600	126720	54720	38880	0.36	25,920
Prescriptions and planning dollars							20,000
Total backlog reforestation							564,050
Impeded areas							
Surveys	500	500	350	350	300	25.50	12750
Brushing	0	80	80	80	80	650.00	0
Density spacing	0	0	0	0	0	0.00	0
Totals hectares	500	580	430	430	380	25.50	12,750
Prescriptions and planning dollars							0
Total impeded areas							12,750
Site Restoration							
Fill planting	0	0	0	0	0	0.00	0
Rehabilitation	0	0	0	0	0	0.00	0
Reforestation	0	0	0	0	0	0.00	0
Totals hectares	0	0	0	0	0	0.00	0
Seed purchase	0	0	0	0	0	0.00	0
Prescriptions and planning dollars							0
Total site restoration							0
Backlog Program Activities - Management Unit Total							
Surveys	4500	4500	3750	3150	2500	25.50	114750
Site preparation	78	400	170	140	110	959.98	74880
Planting	250	450	440	190	135	699.99	175000
Brushing	350	430	580	320	280	475.00	166250
Density spacing	0	0	0	0	0	0.00	0
Totals hectares	5178	5780	4940	3800	3025	102.53	530880
Seed purchase	72000	129600	126720	54720	38880	0.36	25920
Prescriptions and planning							20,000
Recommended studies							0
Total backlog program							576,800
* Seed purchase includes seedlings purchase. Units are number of seedlings, or specify.							605,925

7.5.3. Performance Measures Based on Activities Planned for 2002/2003

TFL 52

Performance Measures Based on Activities Planned for 2002/2003
Based on Type 1 Silviculture Strategy

	Performance Measure	Tree Improve-ment	Nursery Seedling Production	Silv. Survey	Site prep.	Backlog Plant	Brush	Space	Prune	Fertilize	Support staff and admin	Totals
	Inputs											
A	**Planned treatment area (ha) in 2002/2003**	250	0	1,733	78	250	350	0	0	0	2,661	
1.0	**Timber Supply**											
1.1	Potential volume/ha gain (m3/ha/yr)	0.34	0	0.25	0	1.9	0.25	0	0	0.40		
1.2	Years the factor will apply	80	65	65	80	80	65	65	65	65		
1.3	Pot. total merch. volume increment in 65 years (m3)	6,800	0	28,153	0	38,000	5,688	0	0	0		**78,641**
1.4	Est. yrs reduced to achieve management objectives	5-10	1-3	5-10	0	5-20	5	5-30	0	5-10		
1.4	Est. area that will be reclassified as stocked (ha)			200								**200**
1.5	Est. area that will be declared as free growing (ha)			250								**250**
2.0	**Wood Value**											
2.1	Percent improvement in total value at harvest (Compared to no treatment)							5-15%	15-30%	1-5%		
3.0	**Employment**											
3.1	Estimated short term employment (person days/ha)	0.1	0.34	0.1	0.95	2	2.61	3.96	4.54	0.18	0.1	
3.2	Estimated total employment (person days/year)	25	0	173	74	500	914	0	0	0	266	
3.3	Estimated total full time equivalent positions (FTE)	0	0	1	0	3	5	0	0	0	1	**11**
4.1	**Forest Health Enhancement (ha)**											**0**
5.1	**Habitat Supply**											
5.2	Planned area for specific wildlife forage or habitat creation in 2002/2003 (ha)											**0**
5.3	Est. area with secondary value provided to biodiversity (ha)											**0**

7.5.4. Studies Table

See section 8 Cariboo Region Special Studies Summary

7.5.5. TFL 52 Summary Table

TFL 52

Management Unit Summary Table

For the 2002/03 Fiscal Year

	Treatment Area Goals (ha)					Plan 2002/03	
	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	Unit Cost ($/ha)	Funding ($)
Enhanced Forestry Program Field Activities	750	970	970	970	970	25	19,125
Planning, prescriptions and seedlings							10,000
Backlog Program Field Activities	5,178	0	0	0	0	103	530,880
Planning, prescriptions and seedlings							45,920
Totals	5,928	970	970	970	970		605,925

Performance Measures

Potential total merchantable volume increment in 65 years	78,641 m^3
Estimated ha that will be reclassified as stocked	200 ha
Estimated ha that will be declared as free growing	250 ha
Estimated total full time equivalent positions generated	11 FTEs
Forest health enhancement area	0 ha
Planned area for specific wildlife forage or habitat creation	0 ha
Estimated area with secondary value provided to biodiversity	0 ha

8. Cariboo Region Special Studies Summary

Rank	Project Name and Short Description	FRBC's Cost 2002/2003
1	Site Productivity Adjustment: To review the opportunity to revise the site indices by site series for the whole Cariboo Forest Region	$500 000
1	Caribou Habitat Enhancement: Increase available caribou habitat by thinning and fertilizing or rehabilitating over dense pine stands in the west.	project presently ongoing $25 000
1	West Fraser Mills Root Trial - Horsefly Forest District Test Hypheloma fungus for Root Rot management at 1 and possibly 2 sites at Quesnel Lake.	$7 000
2	Methodology for Identifying Commercial Thinning Opportunities: Create a decision support tool to help locate and evaluate suitable CT areas.	$25 000

9. Appendix A. RMP Contact and Support Personnel

Management Unit	Name	Affiliation
Cariboo Forest Region	Guy Newsome	MOF
	Ray Leduc	MOF
	Becky Bings	WLAP
	Richard Mumford	RMP Coordinator
Quesnel TSA	Brad Powell	MOF, Quesnel District
	Al Hunter	West Fraser
	Rob Cochrane	West Fraser
	Gerry Powell	Weldwood, Tolko
	Jason Neumeyer	Slocan Forest Products
Williams Lake TSA	Gerry Chapman	MOF, Williams Lake District
	Laura Smith	MOF, Chilcotin District
	Gerry Mooney	MOF, Horsefly District
	Tim Harding	Riverside Forest Products
	Kim Peel	Lignum
	Shane Schofield	Weldwood
	Guy Burdikin	West Fraser
	Shauna Kortz	Yun Ka Whuten
100 Mile House TSA	Carolyn Krawchuck	MOF, 100 Mile House District
	Wayne Nuyens	West Fraser
	Val Duffin	Weldwood
	Kim Peel	Lignum

10. Appendix B. References Supporting the Sustainable Harvest Component

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11. Appendix C. Authorized Signatory

Ministry of Forests

_____ Date: _____

Authorized Signatory

Cariboo Forest Region

Resource Management Plan

2002/2003

Strengthening Sustainable Forest Management

September 15, 2001

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Appendix 1: Contact Information
Appendix 2: Template 1 – Regional Issues
Appendix 3: Template 2 – Knowledge Strategies
Appendix 4: Template 3 - Activity Descriptions

1. Introduction and Planning Context

Sustainable forest management is defined by the Canadian Council of Forest Ministers (1992) as "management to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations". The strengthening sustainable forest management (SSFM) strategic objective sets out to meet that definition by funding projects that will develop tools and knowledge for achieving sustainable forest management. The projects proposed under SSFM were developed to further the SSFM principle by addressing the primary forest management issues in the Cariboo Forest Region. These issues, and corresponding knowledge strategies and projects were determined in the context of sustainable forest management in the Cariboo Forest Region.

1.1. Overview of Planning Approach

Effort to complete the SSFM component of this Resource Management Plan (RMP) was shared by a number of committees comprised of government agencies and forest industry representatives. The membership of those committees is detailed in Table 1 and Table 2 within Appendix 1.

The planning team determined sustainable forest management issues of the Cariboo Forest Region, with members from both government agencies and industry. A team of Senior Managers representing the Ministry of Forests, Ministry of Sustainable Resource Management, Ministry of Water, Land, and Air Protection and Tree Farm and Forest License holders then prioritized these issues.

The prioritized issues were then fully described, knowledge strategies were developed, and the planning team identified projects. Issue, knowledge and project templates are found in Appendices 2, 3, and 4. A smaller ranking group comprised of planning team members then ranked the projects by priority for funding. The final project priorities were determined by the stewardship agencies

1.2. Summary of Status of Strategic Land Use Planning in Region

Forest resource management in the Cariboo Forest Region is directed by a Cabinet-approved Higher Level Plan, the Cariboo-Chilcotin Land Use Plan (CCLUP) (Province of British Columbia, 1995). Sub-regional planning is currently underway throughout the Cariboo Forest Region. Table 1 outlines the current status of sub-regional planning.

Table 1: Status of Sub-Regional planning in the Cariboo Forest Region

Sub-Regional Plan	Plan Status
Anahim Round Table	Complete
South Chilcotin	Complete
100 Mile House	In progress
Horsefly	In progress
Kluskus	In progress
Williams Lake	In progress
Chilcotin	In progress
Quesnel	In progress

1.3. Summary Status of Timber Supply Review in the Region

The Cariboo Region contains three Timber Supply Areas and two Tree Farm Licenses. The timber supply review schedule for these is presented in tables 2 and 3. The Williams Lake TSA is at the Analysis Report Stage, while the Quesnel and 100 Mile House TSA's are at the public discussion paper stage.

Table 2: Timber Supply Area TSR Schedule

TSA	Information Report / Data Package	Analysis Report	AAC Decision & Rationale Statement
100 Mile House	30-Apr-98	Jun-01	Nov-01
Quesnel	29-June-99	15-Feb-01	July-01
Williams Lake	05-Aug-99	Jul-01	Oct-01

Table 3: Tree Farm Licenses TSR Schedule

TFL	Licensee	AAC Decision & Rationale Statement
5	Weldwood of Canada	Oct-02
52	West Fraser Mills Ltd.	Nov-01

2. Summary of Regional SSFM Issues

The key issues in the Cariboo Region were determined by the planning team and subsequently prioritized by senior managers. Table 4 summarizes the key issues and the senior managers priority ranking. See Appendix 2 for the detailed templates of each issue.

Table 4: Key Issues and Senior Managers Ranking

Key Issue	Senior Manager's Priority Ranking
Biodiversity	High
Mountain Caribou (east)	High
Northern Caribou (west)	High
Information Management	High
Integration	High
Mule Deer Winter Ranges (MDWR)	High
Strategic Timber Access Targets	High
Timber Supply Review	High
Timber Enhancement	High
Fish Values	Moderate
Monitoring	Moderate
Species at Risk and Other Wildlife	Moderate
Watershed Values	Moderate

2.1. Current Outbreak of Mountain Pine Beetle

The current outbreak of mountain pine beetle in the Cariboo Region has created a condition that pervades all other issues. The current mountain pine beetle infestation in the Cariboo Forest Region may affect a number of planning initiatives. The infestation and the timing and location of related harvesting activities may conflict with or impact existing strategies and plans. In particular, strategies for caribou habitat, mule deer winter range habitat, biodiversity, riparian management, and overall watershed integrity may be affected. Harvesting activities may also conflict with the goals and objectives of SRP's and LRMP's. A strategy which identifies the affect the infestation and related harvesting activities will have on other values and initiatives, opportunities which will limit risk to these values and initiatives, and the processes required to monitor the affect, needs to be developed and implemented.

3. Summary of Knowledge Strategies

Knowledge strategies were designed in a top down approach, with additional guidance and information from existing multi-year projects. The strategies detail whether new information will be gathered, value added to existing information or a combination of both. Activities associated with each knowledge strategy are listed as a component of each knowledge strategy. See Appendix 3 for the templates of each knowledge strategy.

4. Summary of Regional Investment Recommendations

Members of the planning team submitted potential projects that fell under each issue. A project (activity) level priority ranking was completed by a sub-committee of the planning team (ranking group) which was comprised of both industry and agency members. . The final project priorities were determined by the stewardship agencies.

Table 5 is the 'Regional Project (Activity) Summary Table' (Template 4) which shows the final project list recommended for funding. Table 6 is a 'Condensed SSFM Project Summary Table, by descending order of priority showing the final project list. Appendix 4 contains the Project (activity) proposal templates, which provide project descriptions, timeframes, and annual budgets.

Table 5: Regional Project (Activity) Summary Table – Template 4

SSFM issue number	activity				benefits		required completion date	potential source of funding	Investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
0	RMP-02-1	Terrestrial Resource Inventory Mapping (TRIM 2)	E, U	E	R	CCLUP	2004	RIP	1,117,000	3	500,000	250,000	0	0	0	1,867,000	5	H
9	RMP-02-2	Timber Enhancement Strategy Development for the Cariboo Region	E, U	E	R	CCLUP, TSR	2004	RIP	450,000	2	500,000	500,000	0	0	0	1,450,000	4	H
1a	RMP-02-3	Biodiversity Strategy: Patch size, old targets and seal contributions	E, U	E	R	CCLUP, TSR	2004	RIP	?	?	100,000	25,000	0	0	0	125,000+?	3+?	H
1a	RMP-02-4	Old and Mature Forest Attribute Definition	E, U	E	R, P	CCLUP, TSR	2005	RIP	100,000	2	50,000	50,000	50,000	0	0	250,000	5	H
2 and 3	RMP-02-5	CCLUP Caribou Strategy - Objectives, targets and monitoring of caribou populations and habitat use	E, N, U	E	R, P	CCLUP, TSR	2007+	RIP	?	?	235,000	140,000	130,000	60,000	60,000	625,000+?	5+?	H
2	RMP-02-5A	Caribou Habitat Mount Tom Adaptive Management Trials	E, U, N	E	R, P	CCLUP, TSR	2019	RIP	105,000	3	50,000	50,000	50,000	50,000	50,000	355,000	20	H
3	RMP-02-5B	Caribou Habitat Satah Mountain Adaptive Management Trials	E, U, N	E	R	CCLUP, TSR	2019	RIP	662,800	3	26,400	26,400	26,400	26,400	26,400	794,800	20	H
2	RMP-02-6	CCLUP Caribou Strategy - Monitoring of Wolf Habitat Use and Foraging Strategy	E, N	E	R	CCLUP	2007	RIP	82,000	1	120,000	120,000	120,000	70,000	70,000	582,000	6	H
10	RMP-02-7	1:20,000 Fish and Fish Habitat Inventory	E, U, N	E	R	CCLUP, TSR	2015	RIP	8,000,000	7	335,000	1,000,000	1,000,000	1,000,000	1,000,000	12,335,000	20	M
	RMP-02-8	MDWR Management Plans									180,000							
12	RMP-02-9	Inventory of Red and Blue Listed Species and Their Habitats, Rare Plants and Rare Ecosystems	E, U	E	R	CCLUP	2006	RIP	305,000	2	100,000	200,000	200,000	100,000	0	905,000	6	M
10	RMP-02-10	Digital Roll-up Fisheries Inventory	E	E	R	CCLUP	2020	RIP	40,000	2	30,000	50,000	50,000	50,000	50,000	280,000	20	M
12	RMP-02-11	CCLUP Moose Strategy	E, N	E	R	CCLUP	2003	RIP	97,500	?	60,000	0	0	0	0	257,500	?	M

Table 5: Regional Project (Activity) Summary Table – Template 4 continued

SSFM issue number	activity				benefits		required completion date	potential source of funding	investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
2	RMP-02-12	Grizzly Bear Population Inventory and Habitat Inventory	E, N	E	R	CCLUP	2007	RIP	50,000	1	200,000	200,000	200,000	75,000	75,000	800,000	6	M
8	RMP-02-13	Adaptive Management Trial of the Mountain Caribou Strategy	E, N	N	R	CCLUP, TSR	2007	RIP	0	0	40,000	40,000	40,000	40,000	40,000	200,000	5	H
8	RMP-02-14	Prognosis Model Development	E, U	E	R	CCLUP, TSR	2005	RIP	200,000	1	167,000	150,000	150,000	0	0	667,000	4	H
1a	RMP-02-15	Evaluate Natural Disturbance Type (NDT) Patterns	E, U, N	E	R	CCLUP, TSR	2003	RIP	200,000	?	50,000	0	0	0	0	250,000	?	H
1b	RMP-02-16	Stand Structure and Seral Stage Definitions	E, U, N	E	R	CCLUP, TSR	2004	RIP	220,000	1	150,000	20,000	0	0	0	390,000	?	H
9	RMP-02-17	Managed Stand Growth and Yield (MSGY) Program	E, U, N	E	R	CCLUP, TSR	2006	RIP	600,000	2	100,000	100,000	100,000	100,000	0	1,000,000	6	H
1a	RMP-02-18	Forest Health Remote Sensing Research	E, U	E	R	CCLUP	2003	RIP	30,000	?	25,000	0	0	0	0	55,000	2	H
8	RMP-02-19	Net Volume Adjustment Factor - WLTSA	E, N	E	WLTSA	CCLUP, TSR	2003	RIP	?	?	75,000	0	0	0	0	?	5	H
12	RMP-02-20	Caribou-Chilcotin Furbearer Inventory	E, N	E	R	CCLUP	2004	RIP	245,000	3	90,000	100,000	0	0	0	435,000	5	M
1b	RMP-02-21	Uniform Shelterwood Systems for Even-Aged Douglas-fir/Lodgepole Pine Stands in the SBSdw1 Subzone	E, N	E	R	CCLUP, TSR	2015	RIP	151,000	3	14,000	40,000	40,000	40,000	40,000	315,000	15	H
8	RMP-02-22	Growth and Yield Permanent Sample Plot (PSP) Re-measurement in the Cariboo Forest Region	E, N	E	R	CCLUP, TSR	indefinite	RIP	295,000	2	120,000	75,000	80,000	0	0	570,000	indefinite	H
12	RMP-02-23	Mountain Goat Strategy	E	E	R	CCLUP	2005	RIP	110,000	1	60,000	40,000	40,000			250,000	4	M
8	RMP-02-24	Inventory Strategy - All Resources	E	N	R	CCLUP, TSR	2003	RIP	0	0	40,000	0	0	0	0	40,000	1	H
10	RMP-02-25	Winter Limnologies	E, N	E	R	CCLUP	2007	RIP	80,000	6	10,000	0	10,000	0	10,000	110,000	11	M

Table 5: Regional Project (Activity) Summary Table – Template 4 continued

SSFM issue number	activity				benefits		required completion date	potential source of funding	investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
8	RMP-02-26	Pine Bark Beetles Infestation Monitoring	E, N	N	R	CCLUP, TSR	2007	RIP	0	0	100,000	100,000	60,000	60,000	60,000	380,000	5	H
12	RMP-02-27	Bull Trout Intensive Inventory	E, N	N	R	CCLUP	2005	RIP	0	0	150,000	150,000	150,000	0	0	450,000	3	M
4	RMP-02-28	Resource Information Management Framework	E, N	N	R	CCLUP	2003	RIP	0	0	35,000	0	0	0	0	35,000	1	H
13	RMP-02-29	Development of a Predictive Model for Stream Shade	E, N	E	R	CCLUP	2005	RIP	19,000	1	19,000	19,000	19,000	0	0	76,000	4	M
6	RMP-02-30	Silvicultural Systems for Douglas-fir Stands on Very Deep Snowfall Mule Deer Winter Ranges in the Cariboo Forest Region	E, N	E	R	CCLUP	2012	RIP	20,000	2	36,000	22,000	37,000	0	0	115,000	12	H
12	RMP-02-31	Riske Creek Waterfowl Habitat Study	E, N	E	R	CCLUP	2003	RIP	5,500	1	5,500	0	0	0	0	11,000	2	M
11b	RMP-02-32	SSFM Performance Monitoring	E	N	R	CCLUP	2003	RIP	0	0	3,000	0	0	0	0	3,000	1	M
11b	RMP-02-33	Communication/Distribution	E, U	N	R	CCLUP	2003	RIP	0	0	37,000	0	0	0	0	37,000	1	M
8	RMP-02-34	Monitoring Site Index	U, N	N	R	CCLUP, TSR	2007	RIP/ licensee	247,000	2	70,000	70,000	0	0	50,000	437,000	7	H
8	RMP-02-35	Phase II Vegetation Resources Inventory Plots - TFL 52	N	N	R	CCLUP, TSR	2005	RIP/ licensee	1,350,000	1	180,000	70,000	25,000	0	0	1,625,000	4	H
2	RMP-02-36	Modified Harvest Valuation Discussion Paper	E	N	R	CCLUP	2004	RIP	0	0	15,000	15,000	0	0	0	30,000	2	H
7	RMP-02-37	Short Term Timber Access	E, U	E	R	CCLUP, SRP	2003	RIP, licensees	0	0	250,000	0	0	0	0	250,000	1	H
7	RMP-02-38	SP Pilot Study for Modified Harvest Areas	E, U	N	R	CCLUP	2004	RIP	0	0	15,000	15,000	0	0	0	30,000	2	H
1b	RMP-02-39	Management Guidelines for Douglas-fir Stocking Densities to Integrate Tree Growth, Biodiversity Objectives and Forage Production in the IDF	N, E, U	N	R	CCLUP	2004	RIP	0	0	15,000	18,000	0	0	0	33,000	2	H

Table 5: Regional Project (Activity) Summary Table – Template 4 continued

SSFM issue number	activity				benefits		required completion date	potential source of funding	investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
8	RMP-02-40	Change Monitoring Inventory	N	N	P	CCLUP, TSR	2005	RIP	0	0	70,000	70,000	70,000	0	0	210,000	3	H
9	RMP-02-41	Managed Stand Plots For Growth and Yield	N	N	R	CCLUP, TSR	2005	RIP	0	0	50,000	70,000	70,000	0	0	190,000	3	H
6	RMP-02-42	Monitoring Stand Level Forest management on Mule Deer Winter Ranges	N, E, U	N	R	CCLUP	2006	RIP	0	0	20,000	20,000	20,000	20,000	0	80,000	4	H
1b	RMP-02-43	Increasing Our Knowledge of the Life Cycle of Dead Wood	N	N	R	CCLUP	2005	RIP	0	0	17,000	17,000	17,000	0	0	51,000	3	H
10	RMP-02-44	Lake Inventory	N, E, U	E	R	CCLUP	2007	RIP	900,000	6	100,000	100,000	100,000	100,000	100,000	1,400,000	11	M
13	RMP-02-45	Terrain and Terrain Stability Classification in Selected Areas of the Cariboo Forest Region	E, U	E	R	CCLUP	2003	RIP	?	?	25,000	0	0	0	0	25,000+?	1+?	M
3	RMP-02-46	Spacing Trial	N, E, U	E	R	CCLUP	2007	RIP	40,000	1	35,000	25,000	25,000	25,000	25,000	175,000	6	H
13	RMP-02-47	Quesnel Lake North Arm Water Quality/Quantity Monitoring Program: Penfold Watershed	N, E	E	R	CCLUP	2004	RIP	200,000	4	50,000	30,000	0	0	0	280,000	6	M
13	RMP-02-48	Automated Watershed Monitoring	N, E, U	E	R	CCLUP	2007	RIP, Licensees, Ministry	378,000	3	86,410	100,000	100,000	100,000	100,000	864,410	8	M
6	RMP-02-49	MDWR Merchantability Pilot/Study	N, E	N	R	CCLIP	2003	RIP, Licensees	0	0	100,000	0	0	0	0	100,000	1	H
8	RMP-02-50	SIBEC Plots	N	E	R	CCLUP, TSR	2006	RIP	?	?	25,000	10,000	10,000	10,000	0	55,000 +?	4+?	H
8	RMP-02-51	Operational Adjustment Factor (OAF) Study for TIPSY	E	E	R	CCLUP, TSR	2003	RIP	150,000	2	180,000	0	0	0	0	330,000	3	H
8	RMP-02-52	Quesnel lake Kokanee	E,N	E	R	CCLUP	2004	RIP	0	0	75,000	0	0	0	0	75,000	1	M
12	RMP-02-53	Growth and Yield Permanent Sample Plot Maintenance throughout the Cariboo Forest Region	N	E	R	CCLUP, TSR	indefinite	RIP	30,000	2	15,000	15,000	15,000	15,000	15,000	105,000+	8+	H

Table 5: Regional Project (Activity) Summary Table – Template 4 continued

SSFM issue number	activity				benefits		required completion date	potential source of funding	investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
8	RMP-02-54	Vegetation Resource Inventory - Phase II 100 Mile House TSA	N	E	R	CCLUP, TSR	2005	RIP	150,000	1	150,000	150,000	85,000	0	0	535,000	4	H
6	RMP-02-55	Mule Deer Population Inventory	N	E	R	CCLUP	2005	RIP	0	0	60,000	50,000	50,000	0	0	160,000	3	H
13	RMP-02-56	Lake Classification	N	E	R	CCLUP	2004	RIP	100,000	3	56,000	56,000	0	0	0	212,000	5	M
1a	RMP-02-57	Incorporate the Impacts of Insects and Diseases into Ecosystem Management Planning	E, U	E	R	CCLUP	2004	RIP	5,000	1	20,000	30,000	0	0	0	55,000	3	H
1a	RMP-02-58	IFPA Mountain Pine Beetle Management Plan	E	E	R	CCLUP	2004	RIP	30,000	1	60,000	10,000	0	0	0	100,000	3	H
1a	RMP-02-59	Landscape Level Planning	E	E	R	CCLUP	2003	RIP	70,000	1	150,000	0	0	0	0	220,000	2	H
9	RMP-02-60	Timber Enhancement Area Pilot	E, N	E	R	CCLUP	2005	RIP	15,000	1	25,000	25,000	25,000	0	0	90,000	4	H
8	RMP-02-61	Landing and Road Rehabilitation Operational Trial	E, U, N	E	R	CCLUP, TSR	2004	RIP	35,000	1	35,000	35,000	0	0	0	105,000	3	H
6	RMP-02-62	Pilot Management Units in Fir	E	E	R	CCLUP	2004	RIP	0	0	30,000	40,000	0	0	0	70,000	2	H
1a	RMP-02-64	SBS-ESSF Old Growth Attributes	E	E	R	CCLUP	2003	RIP	0	0	120,000	0	0	0	0	120,000	1	H
8	RMP-02-65	Monitoring MPB Infested Stands	E	N	R	CCLUP, TSR	2,004	RIP	0	0	50,000	250,000	0	0	0	300,000	2	H
3	RMP-02-66	Northern Caribou 80/20 Lichen Operations Decisions	E	N	R	CCLUP	2004	RIP	0	0	10,000	40,000	0	0	0	50,000	2	H
2	RMP-02-67	Mountain Caribou Population Dynamics	E	N	R	CCLUP	2003	RIP	0	0	10,000	0	0	0	0	10,000	1	H

Table 5: Regional Project (Activity) Summary Table – Template 4 continued

SSFM issue number	activity				benefits		required completion date	potential source of funding	investment to date		investment required					total	total number of years to complete	
	#	name	type	status	scope of benefits	strategic decision or plan			$	years	2002 / 2003	2003 / 2004	2004 / 2005	2005 / 2006	2006 / 2007			priority
3	RMP-02-68	Caribou/Moose/Wolf Population Dynamics Study	E	N	R	CCLUP	2003	RIP	0	0	25,000	0	0	0	0	25,000	1	H
6	RMP-02-69	MDWR OGMA Prescription	E	N	R	CCLUP	2004	RIP	0	0	15,000	15,000	0	0	0	30,000	2	H
6	RMP-02-70	Barriers (biological) to High/Moderate Crown Closure Capability Habitat	E	N	R	CCLUP	2004	RIP	0	0	15,000	15,000	0	0	0	30,000	2	H
9	RMP-02-71	MDWR Timber Access Target Pilot/Study	E	N	R	CCLUP	2003	RIP	0	0	30,000	0	0	0	0	30,000	1	H

Table 6: Condensed SSFM Project Summary Table in Order of Descending Priority

Activity Number	Project Name	2002/2003 Investment	Planning Team Agreement on funding[1]
RMP-02-1	Terrestrial Resource Inventory Mapping (TRIM 2)	500,000	Yes
RMP-02-2	Timber Enhancement Strategy Development for the Cariboo Region	500,000[2]	Yes
RMP-02-3	Biodiversity Strategy: Patch size, old targets and seal contributions	100,000	Yes
RMP-02-4	Old and Mature Forest Attribute Definition	50,000	Yes
RMP-02-5	CCLUP Caribou Strategy – Objectives, targets and monitoring of caribou populations and habitat use	235,000	Yes
RMP-02-5A	Caribou Habitat Mount Tom Adaptive Management Trials	50,000	Yes
RMP-02-5B	Caribou Habitat Satah Mountain Adaptive Management Trials	26,400	Yes
RMP-02-6	CCLUP Caribou Strategy - Monitoring of Wolf Habitat Use and Foraging Strategy	120,000	Yes
RMP-02-7	1:20,000 Fish and Fish Habitat Inventory	335,000	Yes
RMP-02-8	MDWR Management Plans	180,000[3]	Yes
RMP-02-9	Inventory of Red and Blue Listed Species and Their Habitats, Rare Plants and Rare Ecosystems	100,000	Yes
RMP-02-10	Digital Roll-up Fisheries Inventory	30,000	Yes
RMP-02-11	CCLUP Moose Strategy	130,000	Yes
RMP-02-12	Grizzly Bear Population Inventory and Habitat Inventory	200,000	No
RMP-02-13	Adaptive Management Trial of the Mountain Caribou Strategy	40,000	Yes
RMP-02-14	Prognosis Model Development	167,000	Yes
RMP-02-15	Evaluate Natural Disturbance Type (NDT) Patterns	50,000	Yes
RMP-02-16	Stand Structure and Seral Stage Definitions	150,000	Yes
RMP-02-17	Managed Stand Growth and Yield (MSGY) Program	100,000[4]	Yes
RMP-02-18	Forest Health Remote Sensing Research	25,000	Yes
RMP-02-19	Net Volume Adjustment Factor - WLTSA	75,000	Yes
RMP-02-20	Cariboo-Chilcotin Furbearer Inventory	90,000	Yes
RMP-02-21	Uniform Shelterwood Systems for Even-Aged Douglas-fir/Lodgepole Pine Stands in the SBSdw1 Subzone	40,000	Yes
RMP-02-22	Growth and Yield Permanent Sample Plot (PSP) Re-measurement in the Cariboo Forest Region	120,000	No
RMP-02-23A &23B	Mountain Goat Strategy	60,000	No
RMP-02-24	Inventory Strategy - All Resources	40,000	Yes
RMP-02-25	Winter Limnologies	10,000	Yes
RMP-02-26	Pine Bark Beetle Infestation Monitoring	100,000	No
RMP-02-27	Bull Trout Intensive Inventory	150,000	No
RMP-02-28	Resource Information Management Framework	35,000	Yes
RMP-02-29	Development of a Predictive Model for Stream Shade	19,000	Yes
RMP-02-30	Silvicultural Systems for Douglas-fir Stands on Very Deep Snowfall Mule Deer Winter Ranges in the Cariboo Forest Region	36,000	Yes
RMP-02-31	Riske Creek Waterfowl Habitat Study	5,500	Yes
RMP-02-32	SSFM Performance Monitoring	3,000	Yes
RMP-02-33	Communication/Distribution	37,000	Yes
RMP-02-34	Monitoring Site Index	70,000[5]	Yes
RMP-02-35	Phase II Vegetation Resources Inventory Plots - TFL 52	180,000	Yes
RMP-02-36	Modified Harvest Valuation Discussion Paper	15,000	Yes
RMP-02-37	Short Term Timber Access	250,000	Yes
RMP-02-38	SP Pilot Study for Modified Harvest Areas	15,000	Yes
RMP-02-39	Management Guidelines for Douglas-fir Stocking Densities to Integrate Tree Growth, Biodiversity Objectives and Forage Production in the IDF	15,000	No
RMP-02-40	Change Monitoring Inventory	70,000	No

[1] Agreement/Non-agreement for funding by the SSFM RMP Joint Agency/Industry Planning Committee
[2] $1,000,000 level
[3] $2,000,000 level
[4] $3,000,000 level
[5] $4,000,000 level

Activity Number	Project Name	2002/2003 Investment	Planning Team Agreement on funding[6]
RMP-02-41	Managed Stand Plots For Growth and Yield	50,000	No
RMP-02-42	Monitoring Stand Level Forest management on Mule Deer Winter Ranges	20,000	No
RMP-02-43	Increasing Our Knowledge of the Life Cycle of Dead Wood	17,000	No
RMP-02-44	Lake Inventory	100,000	No
RMP-02-45	Terrain and Terrain Stability Classification in Selected Areas of the Cariboo Forest Region	25,000	Yes
RMP-02-46	Spacing Trial	35,000	Yes
RMP-02-47	Quesnel Lake North Arm Water Quality/Quantity Monitoring Program: Penfold Watershed	50,000	Yes
RMP-02-48	Automated Watershed Monitoring	86,410	Yes
RMP-02-49	MDWR Merchantability Pilot/Study	100,000[7]	No
RMP-02-50	SIBEC Plots	25,000	No
RMP-02-51	Operational Adjustment Factor (OAF) Study for TIPSY	180,000	No
RMP-02-52	Quesnel Lake Kokanee	75,000	No
RMP-02-53	Growth and Yield Permanent Sample Plot Maintenance throughout the Cariboo Forest Region	15,000	No
RMP-02-54	Vegetation Resource Inventory - Phase II 100 Mile House TSA	150,000	No
RMP-02-55	Mule Deer Population Inventory	60,000	No
RMP-02-56	Lake Classification	56,000	No
RMP-02-57	Incorporate the Impacts of Insects and Diseases into Ecosystem Management Planning	20,000	Yes
RMP-02-58	IFPA Mountain Pine Beetle Management Plan	60,000	Yes
RMP-02-59	Landscape Level Planning	150,000	Yes
RMP-02-60	Timber Enhancement Area Pilot	25,000	Yes
RMP-02-61	Landing and Road Rehabilitation Operational Trial	35,000	Yes
RMP-02-62	Pilot Management Units in Fir	30,000	No
RMP-02-64	SBS-ESSF Old Growth Attributes	120,000[8]	No
RMP-02-65	Monitoring MPB Infested Stands	50,000	No
RMP-02-66	Northern Caribou 80/20 Lichen Operations Decisions	10,000	No
RMP-02-67	Mountain Caribou Population Dynamics	10,000	No
RMP-02-68	Caribou/Moose/Wolf Population Dynamics Study	25,000	No
RMP-02-69	MDWR OGMA Prescription	15,000	No
RMP-02-70	Barriers (biological) to High/Moderate Crown Closure Capability Habitat	15,000	No
RMP-02-71	MDWR Timber Access Target Pilot/Study	30,000	No

[6] Agreement/Non-agreement for funding by the SSFM RMP Joint Agency/Industry Planning Committee

[7] $5,000,000 level

[8] $6,000,000 level

5. Approval

Ministry of Forests

_____ Date: _____
Authorized Signatory

Ministry of Water, Land and Air Protection

_____ Date: _____
Authorized Signatory

Ministry of Sustainable Resource Management

_____ Date: _____
Authorized Signatory

Appendix 1: Contact Information

Table 1: Senior Managers Team

Name	Organization	Phone	Email
Brian Smith, chair	MOF, Cariboo Forest Region	398-4247	Brian.smith@gems.5.gov.bc.ca
Ray Leduc	MOF, Cariboo Forest Region	398-4431	Ray.leduc@gems7.gov.bc.ca
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Al Hicks	Weldwood – 100 Mile House	395-8200	Al_hicks@weldwood.com
Dave Conly	Lignum – Williams Lake	392-3371	Dconly@lignum.com
Rodger Stewart	Ministry of Water, Land and Air Protection	398-4549	Rodger.stewart@gems3.gov.bc.
Ken Vanderburgh	Ministry of Sustainable Resource Management	398-4225	Ken.vanderburgh@gems5.gov.bc.ca
Rick Wheeler	Riverside Forest Products Ltd.	398-3600	Rjwheeler@riverside.bc.ca
Bill Young	BYFM	296-3142	Byoung@wlake.com

Table 2: Planning Team

Name	Organization	Phone	Email
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Rea Fraser	Chiltech Forestry Ltd.	951-3370	Reafraser@hotmail.com

Appendix 2: Template 1 - Regional Issues

SSFM Issue # 1-A	**Title:** Landscape Level Biodiversity

Issue Statement:
The issue contains five statements:

- There is uncertainty regarding what attributes are important to seral stage and how they should be identified and measured.
- There is uncertainty around how to implement patch size in operational plans (e.g. FDP) and how to interpret the results of patch size analysis.
- Management of forest health concerns creates a risk to biodiversity. Conversely, forest health risks may be increased through biodiversity initiatives.
- The effects of biodiversity initiatives on achieving timber access targets require monitoring.
- Stands that experience a species conversion through harvesting require monitoring to determine the implications for biodiversity.

Overview Description of the Regional Strategic Issue:
Understanding, managing and quantifying landscape level biodiversity values is the issue. Improving and refining landscape level biodiversity information will allow assessment of the objectives of the CCLUP. The biodiversity issue includes five sub-issues:

Seral Stage

- Seral stage is currently determined from forest cover map age class calculation, a method that has been questioned regarding its relative accuracy. Additional information in developing attribute definitions for "Mature/Old" and "Old" would allow management of these attributes. Identifying the attributes required to address biodiversity as well as identifying how these attributes should be measured and located is required.

Patch Size

- Patch attribute, size and distribution information is required during operational and strategic planning, as well as during timber supply analysis processes.
- More understanding is required to confirm if managing for patch size is primarily a size issue or if patch attributes are important as well. The issue has evolved since its initial definition through the Biodiversity Guidebook.
- An interpretation guide and pilot testing needs to be developed for interpreting the results of patch size analysis and developing strategies to achieve desired results.
- An assessment of how each district is addressing patch size is required to ensure consistency.

Risk Management

- There is an inter-relationship between the impacts to biodiversity when managing for forest health factors and the impacts to forest health from biodiversity initiatives.

The impacts of forest health factors such as the mountain pine beetle infestation currently affecting much of the north/central portion of the Cariboo Forest Region on biodiversity should be assessed. As well, the potential impacts of biodiversity initiatives as they relate to forest health (i.e. older stands) should be assessed.

Stand Conversion

- Some "older" mature seral forests are harvested and replaced by a species mix reflecting "earlier" seral stages. Understanding, managing and quantifying the affects of stand conversion in relation to maintaining biodiversity is important in some parts of the region.

Monitoring

- Understanding and quantifying progress made towards the achievement of landscape level biodiversity objectives requires a monitoring process. In addition, the effects of biodiversity initiatives on achieving timber access targets require monitoring to ensure that all aspects of the CCLUP are achieved.

Relationship to Sustainable Forest Management:
Improved landscape level biodiversity information will reduce the risks and uncertainties regarding both environmental values and timber resources.

The maintenance of environmental values

- Management guidelines that specifically address seral stage distribution requirements are required to ensure the maintenance of landscape level biodiversity. It is important to know what distribution is required, where it is located, and where recruitment should occur overtime to maintain biodiversity on a stable, sustainable basis.
- The definition of appropriate patch attributes, including considerations pertaining to size, shape and structure, are also necessary. Many species have specific requirements for maintaining a stable population base. Management guidelines that specifically address patch attributes are required to ensure that both strategic and operational plans reflect these environmental values.
- Resource managers must be able to quantify risks to environmental values especially when decisions are made in the context of the current mountain pine beetle infestation.

The sustainable use of timber and non-timber resources

- Landscape level patch attribute studies will provide recommendations designed to best maintain environmental, timber and non-timber values, while making the best use of overlap areas.
- Risks and uncertainty regarding all aspects of timber resource planning will be reduced through improved landscape level biodiversity information. The CCLUP may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop and implement, and Timber Supply Review net-downs may be overly conservative without additional information. Better knowledge will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- Improved landscape level information will more accurately define seral stage related constraints on timber flow during timber supply analyses.
- Advancing knowledge of landscape level seral attributes improves implementation of regional, sub-regional, and timber supply reviews and other strategic resource use plans.
- Management guidelines will provide recommendations designed to best maintain stand level, seral representation while taking into account other values and making the best use of overlap areas.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable - This issue was identified and prioritized at the regional level.
- Note: Information gathered may be transferable to other parts of the Province.

SSFM Issue #: 1B	Title: Stand Level Biodiversity

Issue Statement:
The stand level biodiversity issue contains five statements:

- Management prescriptions should maintain or create appropriate stand level biodiversity attributes.
- Assumptions used in timber supply analysis must reflect stand level biodiversity measures (e.g. WTP's, riparian overlaps etc).
- Refining current WTP direction so it is more flexible and effective in achieving desired results is required.
- The risks associated with the inter-relationship between stand level biodiversity and other initiatives, such as forest health, must be managed through compatible directives.
- The effects of stand level biodiversity management decisions require monitoring to ensure they are achieving the desired results.

Overview Description of the Regional Strategic Issue:
Understanding, managing, and quantifying stand level biodiversity values is the issue. The stand level biodiversity issue contains four sub-sections.

Attribute information

- Stand level biodiversity attribute definitions and intent must be understood to ensure that management prescriptions maintain or create appropriate attributes, and to ensure that stand level biodiversity is correctly modeled in the timber supply analysis. Without this information it is difficult to assess whether or not the intent of management decisions are being met. Examples of additional information needs include defining and quantifying "Old" and coarse woody debris attributes.

Wildlife Tree Patches

- Wildlife tree patches are a component of stand level biodiversity.
- Currently there is direction for the area of WTP's required (relative to each cutting permit or cut block), what attributes should be included, and broad direction for their placement. Refining current WTP direction so it is more flexible and effective in achieving desired results is the objective.

Risk Management

- Understanding, managing for and quantifying the risks associated with stand level biodiversity values is important across the region. Examples of potential risks to stand level and landscape level biodiversity objectives include blowdown, insect attack, and disease within WTP's.
- Additional information will allow an assessment of whether prescriptions fully address management objectives.
- Other initiatives, such as those for forest health, should be compatible with stand level biodiversity initiatives to ensure that risks to stand level biodiversity attributes

are managed.

Monitoring

- Understanding and quantifying the effects of management decisions associates with stand level biodiversity through a monitoring process is important across the region. Without this information, it is difficult to assess whether management decisions meet the overall intent of the CCLUP. The effects of biodiversity initiatives on achieving timber access targets also require monitoring to ensure that all aspects of the CCLUP are achieved.

Relationship to Sustainable Forest Management:

There are risks and uncertainties regarding both environmental values and timber resources that could be minimized through enhancing the knowledge of stand level biodiversity.

The maintenance of environmental values

- Appropriate attributes are required to adequately address stand level biodiversity. Management guidelines that specifically address appropriate methods to maintain stand level attributes will reduce risk and uncertainty to stand level biodiversity.
- An appropriate quantity and quality of WTP areas are required to address statutory decision-maker guidance. Management guidelines are required to ensure their adequate placement. It is important to know the preferred stand level attributes of a WTP in order to determine their optimal location.
- Understanding and managing natural risks (blowdown, disease, and insects) will minimize uncertainty regarding stand level biodiversity.

The sustainable use of timber and non-timber resources

- Risks and uncertainty regarding all aspects of timber and non-timber resource planning would be reduced through increased information regarding stand level biodiversity attributes. In the absence of adequate management guidelines, prescriptions may impact the achievement of timber access and other targets by not taking advantage of overlap areas.
- The regional land use plan direction may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop or implement, and Timber Supply Review net downs may be overly conservative without stand level biodiversity risk management information.

Relationship to Strategic Resource Plans and Decisions:

- The CCLUP requires that biodiversity values be maintained.
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information regarding stand level biodiversity.

Cross Reference to Management Unit Issues (if applicable):

- Not Applicable - This issue was identified and prioritized at the regional level.
- Note: This information may be transferable to other parts of the Province.

SSFM Issue # 2	**Title:** Mountain Caribou (East)

Issue Statement:
Mountain Caribou are red-listed provincially and are facing pressures on their habitat due to predation and motorized access.

Overview Description of the Regional Strategic Issue:
Caribou populations within the region are considered regionally, provincially and nationally significant. Mountain caribou in the eastern portion of the region are also red-listed provincially.

The over riding objective for mountain caribou stated in the Cariboo Chilcotin Land-Use Plan is "to maintain habitat values" (page 156). Caribou habitat (and the quality of that habitat) cannot be considered in isolation from the affects of predation and access. Without additional knowledge of habitat requirements and characteristics, and how caribou are affected by predation and access, it is difficult to assess whether or not the objectives of the CCLUP are being met.

The issue surrounding mountain caribou in the eastern portion of the region can be divided into predation, access, and habitat sub-issues.

Predation

- The wolf population and the resulting predator /prey relationship between the two species has been identified as a threat to the mountain caribou.
- The interrelationship between caribou, moose and wolf population dynamics has been identified as a potential threat to caribou.

Access

- Motorized road and off-road access has been identified as a threat to both mountain caribou and to caribou habitat. Knowledge gaps regarding the effects of management exist.

Habitat

- The effects of modified harvesting on caribou, caribou habitat, silviculture, forest health and valuation are not well understood. Adaptive management trials are underway.

Relationship to Sustainable Forest Management:
There are risks and uncertainties regarding both environmental values and timber resources that could be minimized through enhancing the knowledge of mountain caribou.

The maintenance of environmental values

- Predator / prey relationships have been identified as one of the primary threats to mountain caribou, therefore it is critical to understand and manage predation impacts.
- Roads and snowmobile trails provide predators with easier access to mountain caribou; therefore it is important to quantify and manage access within mountain caribou habitat.
- An appropriate quantity and quality of habitat is required to support the mountain caribou population. It is important to know what suitable and capable habitat is, where it is currently located on the landscape, and where recruitment should occur over time to maintain habitat supply on a stable, sustainable basis.

The sustainable use of timber and non-timber resources

- Risks and uncertainty regarding all aspects of timber and non-timber resource planning could be reduced through increased knowledge of mountain caribou.
- Adaptive forest management has the potential to provide access to timber while maintaining habitat values.
- The regional land use plan direction may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop or implement, and Timber Supply Review net downs may be overly conservative without further information.
- Better knowledge of mountain caribou will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP requires the maintenance of mountain caribou habitat, the quality of which is influenced by both access and predation.
- The Mountain Caribou Strategy (October 2000) provides recommendations designed to best maintain caribou values while taking into account stakeholder values and making the best use of overlap areas.
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable: This issue was identified and prioritized at the regional level.
- Note: This information may be used in adjoining mountain caribou habitat areas in the Kamloops and Prince George Forest Regions.

SSFM Issue # 3	Title: Northern Caribou (West)

Issue Statement:
Predation and access issues are currently affecting the quality of Northern Caribou habitat.

Overview Description of the Regional Strategic Issue:

- Caribou populations within the region are considered regionally, provincially and nationally significant. Northern caribou within the Cariboo Forest Region are comprised of three herds, the Itcha-Ilgachuz herd, the Rainbow Mountain herd, and the Charlotte Aplands herd.

- The Cariboo Chilcotin Land-Use Plan states that northern caribou habitat values should be maintained (pages 97 and 157). It also states that an access management strategy should be applied that addresses conflicts between wildlife and snowmobiles and ATVs, and restricts permanent road access (page 71).

- Caribou habitat (and the quality of that habitat) cannot be considered in isolation from the affects of predation and access. Without additional knowledge of habitat requirements and characteristics, and how caribou are affected by predation and access, it is difficult to assess whether or not the objectives of the CCLUP are being met. Sub-issues regarding northern caribou fall into three categories:

Predation

- The predator prey relationship between the wolf population and the northern caribou has been identified as a potential threat to the Charlotte Alplands herd and is also suspected of influencing the calving survival rates in the Rainbow Mountain herd. At this time, wolf predation is not a limiting factor for the Itcha-Ilgatchuz herd.
- An increased understanding of the interrelationship between caribou, moose and wolf population dynamics is required to fully understand the potential impact on caribou.

Access

- An effective access management strategy is required. It must incorporate how the management of roaded and off-road access affects caribou habitat and other users.

Habitat

- Knowledge gaps in adaptive management, silviculture, forest health, lichen studies, timber enhancement, ecosystem management, prescriptions and stand viability must be addressed to fully understand their affect on caribou habitat. In addition, related valuation issues must be considered and migration routes across the Dean River corridor investigated.

Relationship to Sustainable Forest Management:
The risks and uncertainties regarding both environmental values and timber resources would be minimized through enhancing the knowledge of northern caribou habitat

requirements.

The maintenance of environmental values

- Predator/prey relationships have been identified as one of the primary threats to northern caribou, therefore it is critical to understand and manage predation impacts.
- Roads and snowmobile trails provide predators with easier access to northern caribou; therefore it is important to quantify and manage access within northern caribou habitat.
- An appropriate quantity and quality of habitat is required to support the northern caribou population. It is important to define what suitable and capable habitat is, where it is currently located on the landscape, and where recruitment should occur over time to maintain habitat supply on a stable, sustainable basis.

The sustainable use of timber and non-timber resources

- Risk and uncertainty in all aspects of timber and non-timber resource planning would be reduced by increasing knowledge regarding northern caribou.
- Adaptive forest management has the potential to provide access to timber while maintaining habitat values.
- The regional land use plan direction may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop or implement, and Timber Supply Review net downs may be overly conservative without further information.
- Better knowledge of northern caribou will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP states that northern caribou habitat values will be maintained.
- 1998 Caribou Strategy Update and the final Northern Caribou Strategy, expected December 2001, will provide further direction to address northern caribou issues.
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable - This issue was identified and prioritized at the regional level.
- Note -This information may be used in adjoining northern caribou habitat areas in the Prince Rupert and Prince George Forest Regions.

SSFM Issue # 4	**Title:** Information Management

Issue Statement:
Provincially and regionally important resource management information derived from research and trials is not being used to their full potential due to information management issues.

Overview Description of the Regional Strategic Issue:
The management of information is an issue of great importance to higher level planning in the Cariboo Region.
The products of knowledge building activities are not being used to their full potential due to information management issues including:

- Lack of timely access to information by stakeholders.
- Information stored in non-digital or non-standard formats.
- Need to translate non-standard information prior to use.

Currently there is potential that the results of previous analysis and research may be lost or unrealized, leading to duplication of effort and investments. Information must be made available in a standardized and maintained format to all interested parties in order to maximize use of the products of previous investments and ensure appropriate future investments. Any information management strategies should be coordinated with the information management strategies of parties involved in the RMP. The issue can be described as having four components:

Distribution and Availability

- Ready availability and distribution of information from a centralized electronic source will facilitate CCLUP implementation and TSR analysis. Users need to know what is available, where it is located, and how to access it.

Standards

- Standardized format and structure of data is required for large-scale analysis of information from individual projects. Data resulting from future RMP projects must be compatible with standardized formats and structures.

Maintenance

- Maintenance of information is required to protect data integrity. Overall responsibility for the condition of the data must be taken by a data custodian. Maintenance must be consistent with regional and provincial approaches to information management while at the same time address local considerations. Overall responsibility for maintenance of information must be identified.

Multi-level planning

- Information developed for one level of planning should be made readily available for other levels where appropriate. Multi-level issues and needs should be identified

prior to information gathering to ensure all needs are being addressed and coordinated with other data base users.

Relationship to Sustainable Forest Management:

- Risk and uncertainty to environmental values, non-timber and timber resources will be reduced if the best information is made routinely available to forest management practitioners and decision-makers.
- The distribution of information will be facilitated through standardization. Information should be routinely available and compatible with industry standard mapping and GIS software.

Relationship to Strategic Resource Plans and Decisions:

- Effective implementation of the CCLUP requires that decisions be made with the benefit of sound information. Standardized information must be made available for all levels of analysis and to all interested parties. Information management structures must be adequately maintained to a standard appropriate for strategic resource planning.
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information management.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable - This issue was identified and prioritized at the regional level.

SSFM Issue #: 5	Title: Integration Direction

Issue Statement:
The direction provided by the CCLUP must be integrated into sub-regional and all other strategic planning processes.

Overview Description of the Regional Strategic Issue:
Ensuring that the direction provided by the CCLUP is integrated into sub-regional and all other strategic planning processes is critical throughout the region. An analysis of these plans to cumulatively meet CCLUP targets is required to assess overall achievement of the CCLUP intent. A regional roll-up and test of the ability of SRP's and other strategic plans to meet CCLUP targets is required prior to approval of any specific plan.

Relationship to Sustainable Forest Management:
The CCLUP was developed on the concept of sustainability. Ensuring that the direction provided by the CCLUP is integrated into SRP processes will reduce risk and uncertainty to environmental values, timber and non-timber resources.

Relationship to Strategic Resource Plans and Decisions:

- Effective implementation of the CCLUP requires that strategic level decisions be made within the context of the CCLUP objectives. In aggregate, the outputs of sub-regional plans must be consistent with CCLUP targets.
- The CCLUP balances social, environmental and economic objectives. Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit if appropriate strategic level roll-ups and tests are made to ensure consistency with the CCLUP.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable - This issue was identified and prioritized at the regional level.

SSFM Issue # 6	**Title:** MDWR Management Planning

Issue Statement:
A lack of information regarding managing for MDWR has delayed cutting authority approvals.

Overview Description of the Regional Strategic Issue:

- An appropriate quantity and quality of winter-range habitat is required to support mule deer populations. To ensure an adequate supply of winter range habitat, a strategic approach to management planning is necessary. The development of management plans that address forest cover retention targets, timber targets and opportunities for overlapping other values and strategies is required.
- Lack of information has delayed cutting authority approvals, as a precautionary approach has been taken to compensate for a lack of complete understanding of the issue.
- Mule Deer Winter Range management planning involves analyzing the current state, describing the desired future state, and developing appropriate strategies to move from the current state to the desired state.

Current state

- The current state of mule deer winter ranges must be defined in order to assess whether or not the objectives of the CCLUP are being met. Current information regarding capability and suitability provides a baseline from which to develop management strategies to move toward the desired state.

Future state

- Defining the desired future conditions of each individual MDWR and determining how to achieve them is integral to the management plan. Monitoring is required to ensure that all relevant CCLUP objectives are met during the development of mule deer winter range management plans.

Management Planning

- MDWR Management plans are required to guide development within MDWR's, which will aid in expediting cutting authority approvals. MDWR Plans should incorporate other overlapping values and strategies. Pilot testing and monitoring systems for MDWR must also be developed.

Relationship to Sustainable Forest Management:
Viable MDWR are required to support mule deer populations. Enhanced information regarding environmental values, timber and non-timber and resources in relation to mule deer winter ranges would minimize risks and uncertainties in this area.

The maintenance of environmental values

- Knowledge of the current state and the desired future state of mule deer winter

ranges, and the preparation of management plans to guide development within MDWRs will aid in maintaining habitat supply on a stable, sustainable basis.

<u>The sustainable use of timber and non-timber resources</u>

- Risks and uncertainty to timber and non-timber resources will be reduced by increasing the knowledge of mule deer winter ranges. Because of the cautionary approach being used, timber access targets are at risk.
- The CCLUP direction may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop or implement, and Timber Supply Review net downs may be overly conservative without further information. Better knowledge of the current and future states of mule deer winter ranges and the development of Management Plans will provide access to timber while maintaining mule deer habitat and support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP requires "the maintenance of mule deer winter range in a condition that will support the regional population during critical winter conditions" (page154). Enhanced information regarding the current state of mule deer winter ranges, the desired future state, and the completion of Management plans will allow an assessment of whether the objective is being achieved or exceeded.

- Forest development plans, landscape unit plans and the timber supply review process across the entire region will all substantially benefit from improved information. Currently a precautionary approach has been used that has delayed many cutting authority approvals.

Cross Reference to Management Unit Issues: (if applicable)

- Not Applicable – issues were identified and prioritized at the regional level
- Note: -This information may also be used for mule deer winter range management in the Kamloops, Nelson, and Prince George Forest Regions.

SSFM Issue #: 7	**Title:** Strategic Timber Access Targets

Issue Statement:
The direction by the CCLUP to meet timber access targets must be incorporated into all levels of planning.

Overview Description of the Regional Strategic Issue:
Timber targets assure the forest industry access to the forest land base. Timber targets also reflect the presence of other prominent non-timber values.

The CCLUP establishes five kinds of targets for the timber resource, which are further broken down into sub-unit targets:

- Overall target for the zone
- Percentage of the forest in each polygon available for conventional timber management
- Percentage of the forest in each polygon available for harvest, if the timber management regimes are modified to more sensitive practices.
- Percentage of the forest in each polygon not available for harvest at this time
- Percentage of the forest in each polygon available for enhancing timber productivity (requires further development over time)

Timber access targets must be met, as are all other CCLUP targets. This requires measurement, monitoring and reporting of progress being made towards achieving these targets. This issue can be split into four sub-issues:

Long term Timber Access Targets

- A long-term timber access strategy reduces uncertainty for all stakeholders. A monitoring process is required to ensure the SRP stays on track and to assess the relationship between timber access targets identified in the CCLUP and the SRP. Monitoring progress towards achieving long term timber access targets is a component of monitoring CCLUP implementation.

Modified Harvest

- Modified harvest provides an opportunity for resource managers to harvest areas while retaining other resource values.

Procedures for providing access to up to ten percent of no-harvest areas in response to catastrophic events are required.

Forest Health

- Aging timber resulting from modified harvest practices and no-harvest zones can have increased forest health risks. The implications of forest health issues on both timber access targets and other values needs to be evaluated.

Short Term Timber Access Targets

- The Cariboo-Chilcotin Land Use Plan addresses long-standing concerns around

sustaining the region's economy, including access to timber for the local forest industry. Key to this is the maintenance of the short-term timber supply.

- A regional strategy should be developed to address the key issues that will affect the wood supply over the next few years. This strategy could result in the development of a new or revised short-term timber availability plan.
- After completion of each sub-region plan process, the short term timber availability plan should be re-assessed using the updated SRP information.

Relationship to Sustainable Forest Management:

Risks and uncertainties pertaining to environmental values, timber and non-timber resources can be reduced through better understanding of how to achieve timber access targets.

- Understanding the impacts of all initiatives associated with timber access, including forest health issues and modified harvest will support long-term maintenance of environmental values. Modified harvest will provide access to timber while maintaining environmental values and non-timber resources.
- Improved knowledge regarding timber access targets will reduce risks and uncertainty. The regional land use plan direction may not be effectively implemented, forest development plans may remain in contention, landscape unit planning and objective setting may be difficult to develop or implement without a timber access target strategy. Better knowledge of timber access targets will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- The Cariboo-Chilcotin Land Use Plan addresses long-standing concerns around sustaining the region's economy through setting timber access targets for the local forest industry. If CCLUP timber targets are not met, the plan will not have been fully implemented.
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information.

Cross Reference to Management Unit Issues (if applicable):

- Not Applicable - This issue was identified and prioritized at the regional level.

SSFM Issue #: 8	Title: Timber Supply Review

Issue Statement:
A strategy must be developed to update inventories, to coordinate activities and to establish priorities so that the best possible information is made available to the timber supply review process.

Overview Description of the Regional Strategic Issue:
Timber supply review (TSR) should use the best information available. A strategy should be developed to direct the activities that build information required for the TSR. Priorities must be determined for a coordinated approach to inventory. This information falls into the sub-categories detailed below.

Inventory

- Enhancing, updating and/or expanding the existing inventory information set to support a sound defensible timber supply analysis is a regional need. Inventory limitations reduces the reliability that the TSR accurately models the current state of forest management, or whether CCLUP targets are being met.
- A strategy is required to identify priority inventory needs.

Baseline Growth and Yield

- Baseline growth and yield information is needed to support predictions under the current management practices used within TSR. Site index of managed stands has been underestimated in many areas of BC. A positive adjustment in site index can be the single greatest contributor to increased yield predictions.
- The critical information gaps within both natural uneven-age and managed (both even and uneven aged) conditions must be addressed.
- Even-aged equations within natural stands require a maintenance focus.
- A strategy is required to identify the future emphasis for growth and yield.

Productive Land Base

- The impacts of net downs to the productive land base, as identified in timber supply analyses, are a major component of the timber supply review process. Without current and reliable data, it is difficult to assess whether the net downs for various factors (e.g. terrain, riparian management, habitat, roads and landings) are accurately reflected and that the operational adjustment factors are reliable.
- Measurement of the performance of problem forest types and mountain pine beetle damaged stands is also required.

Analysis Model

- Timber supply review assumptions require validating and monitoring through testing, analysis and modeling. Without this work it is difficult to confirm that the assumptions used during analysis are optimal.

Relationship to Sustainable Forest Management:
Improved inventory data and analysis for the timber supply review process will reduce risks and uncertainties regarding environmental, timber and non-timber values.

The maintenance of environmental values

- It is important to know what environmental values exist, where they are currently located on the landscape, and how management decisions affect these values when determining timber supply. Sound inventory data is required.

The sustainable use of timber and non-timber resources

- Risks and uncertainties within the timber supply review process would be reduced with improved inventory data, analysis and assumption modeling.
- Assumptions pertaining to the productive land base have real impacts on annual allowable cuts. Timber Supply Review net downs may be overly conservative to compensate for uncertain inventory data. Collecting information that will 'fine tune' these assumptions will reduce uncertainty and risk to the sustainable use of timber.

Relationship to Strategic Resource Plans and Decisions:

- The timber supply review process across the entire region will substantially benefit from improved information.

Cross Reference to Management Unit Issues (If applicable):

- Not applicable - This issue was identified and prioritized at the regional level.
- Note: This information may be used in other strategic planning exercises.

SSFM Issue #: 9	**Title:** Timber Enhancement

Issue Statement: Timber enhancement strategies must be implemented and their affects on long-term timber supply and CCLUP non-timber targets monitored.

Overview Description of the Regional Strategic Issue:

- The CCLUP identifies certain targets or commitments to the forest industry, all designed to give the forest industry secure access to the forested land base.
- Timber enhancement is identified as an opportunity for "addressing any shortfalls or improving the future timber resource." (CCLUP, page 150).
- Within the enhanced resource development zones, the plan challenges all local resource users and government to set targets for increased sustainable resource development.
- Improving access to timber can be addressed through enhancement opportunities while managing for other values. Timber enhancement activities will not be at the expense of other CCLUP targets.

The issue of timber enhancement includes the three sub-issues discussed below:

Timber Access

- Implementation of timber enhancement strategies and identification of additional opportunities that improve timber access while managing for other values is important throughout the region.

Incremental Growth and Yield

- Enhanced growth and yield complements strategies to enhance timber volume and value. Critical information gaps within both natural uneven-age and managed (both even and uneven aged) conditions should be addressed.
- Incremental growth and yield information allows managers to predict the results of silviculture treatments and evaluate whether the expectations of timber enhancement activities can be achieved.

Model Impacts

- Understanding the impacts of timber enhancement activities and their effects on environmental, timber and non-timber CCLUP targets is important throughout the region. Without this information it is difficult to assess whether or not the objectives of the CCLUP are being met. Modeling scenarios and sensitivity analysis will help clarify these impacts.

Relationship to Sustainable Forest Management:

There are risks and uncertainties regarding environmental values, timber and non-timber resources that can be reduced through increased knowledge pertaining to timber enhancement activities.

The maintenance of environmental values

- Timber enhancement activities have the potential to increase the success of achieving timber targets; therefore, timber enhancement activities may reduce pressures on other environmental values over time.
- Modeling the impacts of timber enhancement activities may reduce uncertainty regarding their affect on the maintenance of environmental values and non-timber resources.

The sustainable use of timber and non timber resources

- Improved growth and yield information will allow managers to better predict forest growth. This will reduce uncertainty in regards to the sustainable use of timber.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP requires the development of timber enhancement targets (pages 22 and 150) and identifies the need to foster appropriate demonstration projects for enhanced timber production.
- Forest development planning, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved timber enhancement information.
- Sound, productive forest land base information is key to timber supply reviews and AAC determinations. Modeling and growth and yield information allows managers to better predict the results of timber enhancement activities. Upward pressure on annual cuts may be the result.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable - This issue was identified and prioritized at the regional level.
- Note - This information may be applicable to similar timber stands on similar sites throughout the province.

SSFM Issue # 10	Title: Fish Values

Issue Statement:
The gaps in Fish Inventory and Fish Habitat Inventory information need to be filled.

Overview Description of the Regional Strategic Issue:
The CCLUP directs that fish values be managed. Adequate information to drive management planning for fish values is required. Currently there are gaps in inventory information. Sub-sections of the fish value issue are additional fish inventory and fish habitat inventory information.

Fish Inventory

- Completing the fish population (presence or absence) inventory will increase the probability of meeting CCLUP targets
- Additional inventory information needs include Bull Trout and Kokanee inventories.

Fish Habitat Inventory

- Completing the fish habitat inventory will increase the probability of meeting CCLUP targets.
- Fish habitat information is required at both the strategic and operational planning levels.
- Examples of additional information habitat inventory needs include winter limnology projects to support lake classification.

This additional information will improve managers' ability to assess whether CCLUP objectives regarding fish values have been addressed.

Relationship to Sustainable Forest Management:
There are risks and uncertainties regarding both environmental values, timber and non-timber resources that can be reduced through complete fish inventory and habitat information.

The maintenance of environmental values

- It is important that resource managers understand fish populations and their distribution and fish habitat information in order to make informed decisions.

The sustainable use of timber and non-timber resources

- Risks and uncertainties regarding all aspects of timber and non-timber resource planning would be reduced through better information pertaining to fish values. Better knowledge of fish habitat will support a more stable and predictable timber supply over the long term. It will also assist in scheduling harvesting activities.

Relationship to Strategic Resource Plans and Decisions:

- Lake classification and the management of quality lakes for wilderness fisheries are processes identified in the CCLUP.
- Fish population and inventory information will support CCLUP fisheries objectives.
- Fish habitat information is a key component of lake classification and will provide more accurate data for timber supply reviews and sub-regional planning processes.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable -This issue was determined and prioritized at the regional level.

SSFM Issue # 11-A	**Title:** Monitoring Model

Issue Statement:
Determining the most appropriate method of monitoring the implementation and achievement of CCLUP targets is the issue.

Overview Description of the Regional Strategic Issue:
Determining the most appropriate method of monitoring the implementation and achievement of CCLUP targets is the issue. The Regional Resource Board and the Inter-Agency Management Committee have monitoring responsibilities that must be considered. Two monitoring options exist:

The Provincial Model

- The Land Use Coordination Office has released higher-level plan monitoring procedures. These procedures were designed to test the Kamloops LRMP. Pilot testing this provincial model's ability to address the complexity of the CCLUP is required.

The Cariboo Model

- Early analysis of the provincial model indicates that although suitable for a LRMP, it may be less applicable to the CCLUP, which covers an entire region and several SRPs. Developing and piloting a locally derived, "Made in the Cariboo" monitoring process is an alternative.

Relationship to Sustainable Forest Management:
The CCLUP was developed on the basis of sustainability. Monitoring the implementation and achievement of CCLUP targets will reduce risk and uncertainty regarding the maintenance of environmental values and the sustainability of timber and non –timber resources.

Relationship to Strategic Resource Plans and Decisions:
Monitoring is required to ensure the CCLUP targets are met.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable -This issue was identified and prioritized at the regional level.
- Note - This information may be used to monitor other land-use plans in the province.

SSFM Issue #11B	**Title:** Monitoring The Resource Management Plan and Strengthening Sustainable Forest Management

Issue Statement:
A monitoring process is required to assess both the implementation of the RMP and effectiveness of the SSFM component in addressing regional issues.

Overview Description of the Regional Strategic Issue:
The Resource Management Plan (RMP) focuses on three primary components; Sustainable Harvest (SH), Enhancing Environmental Values (EEV) and Strengthening Sustainable Forest Management (SSFM).The SSFM component of the RMP focuses on addressing issues related to higher level planning and building the knowledge required to address these issues.

The issue is a monitoring process with two components:
RMP Implementation Monitoring

- Activities identified in the RMP must be monitored to ensure they were successfully implemented.

SSFM Effectiveness Monitoring

- The SSFM component of the RMP must be monitored to test the effectiveness of implemented knowledge strategies that contribute to the resolution of forest management issues.

Relationship to Sustainable Forest Management:

- The Resource Management Plan is comprised of three programs – Enhancing Environmental Values, Sustainable Harvest, and Strengthening Sustainable Forest Management.
- The SSFM component of the RMP addresses issues related to higher level planning.
- Without monitoring processes to assess accomplishments and effectiveness, there may be uncertainties and risks to environmental values, timber and non-timber resources.

Relationship to Strategic Resource Plans and Decisions:

- The SSFM section of the RMP is directly related to the CCLUP. Monitoring the implementation and effectiveness of strategies to resolve issues will provide comfort that the CCLUP is being implemented as intended.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable -This issue was determined and prioritized at the regional level.

SSFM Issue # 12	**Title**: Other Wildlife and Species at Risk

Issue Statement:
Forest and land management initiatives must address the conservation of wildlife populations and their habitats.

Overview Description of the Regional Strategic Issue:
Forest and land management initiatives must address the conservation of wildlife populations and their habitats. These wildlife include species at risk and wildlife referenced in CCLUP targets and strategies. Strategies to conserve these species and their habitats depend on information describing habitat requirements, particularly the location, representation and quality of these habitats. In some cases, species or site specific management prescriptions based on habitat and population are required to enable a balanced delivery of CCLUP targets. Understanding, managing, and quantifying the habitat requirements of species at risk and other species through a comprehensive inventory program is need throughout the region.

For some of the CCLUP species (grizzly, mule deer, moose and mountain goat), population assessments are required to determine if habitat and population management strategies are effective relative to CCLUP objectives.

Inventory

- Information describing habitat requirements, location, representation and quality are needed. This information is required to assess whether or not the objectives of the CCLUP, as they pertain to protecting species at risk and other species, are being met.

Management Prescriptions

- Without management prescriptions it is difficult to address the species at risk and other species objectives of the CCLUP, and to determine if these objectives are being met. Management prescriptions that address both landscape and stand level habitat requirements are required to address CCLUP targets.

Processes To Addresses Other Wildlife And Species At Risk

- The development of processes to address specific species at risk and other species is also a component of this issue.
- Developing an effective species at risk, habitat identification process is an example of a process requirement. Without this information it is difficult to assess whether or not the objectives of the CCLUP pertaining to species at risk are being met.

Population Management

- Population assessments are required to determine if habitat and population management strategies are effective relative to CCLUP objectives. Examples of additional information needs include hunter success rates and the affects of road access on population management.

Relationship to Sustainable Forest Management:
There are risks and uncertainties regarding environmental values, timber and non-timber resources stemming that could be reduced through enhanced knowledge regarding species at risk.

The maintenance of environmental values

- Better information, management prescriptions and guidelines that specifically address species at risk and 'other' wildlife are required to ensure the maintenance of all environmental values.

The sustainable use of timber and non-timber resources

- Better knowledge of the habitat requirements of species at risk and 'other' wildlife will reduce uncertainty and risk to the sustainable use of timber and non-timber resources. Better knowledge will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP requires an inventory to identify species and habitats at risk and their management needs. CCLUP also required the preparation and implementation of recovery plans for rare and endangered species, (page 156).
- Each sub-unit within the CCLUP has an objective to manage for grizzly, moose and other species, as stated in the CCLUP (page 156).
- Forest development plans, landscape unit plans and TSR3 across the entire region will all substantially benefit from improved information regarding species at risk and improved information regarding moose, grizzly and other species.

Cross Reference to Management Unit Issues (If applicable):

- Not applicable -This issue was identified and prioritized at the regional level.
- Note - Information gathered will be applicable throughout the province.

SSFM Issue #13	**Title:** Watershed Values - Assessment of Watershed Integrity.

Issue Statement:
Original watershed assessments should be monitored to determine if the implemented recommendations have resulted in the desired improvement in watershed integrity.

Overview Description of the Regional Strategic Issue:

- A watershed assessment to ensure the maintenance of critical fish and wildlife habitats and hydrological stability is required when disturbance levels exceed twenty five percent and in 'key watersheds'. The CCLUP identified the Horsefly River, the Cottonwood/Swift, the Bonaparte (Bridge), and the Cariboo River as high priorities for watershed assessments and watershed/ecosystem restoration (page 160).
- The issue involves revisiting the original watershed assessments to determine the status of recommendations made at that time and to determine if recommendations implemented have resulted in the desired improvements.

Relationship to Sustainable Forest Management:
There are risks and uncertainties regarding environmental values, timber and non-timber resources stemming from the lack of watershed monitoring.

<u>The maintenance of environmental values</u>

- Watershed conditions are critical to the maintenance of environmental values, including fish habitat and water quality. It is necessary to monitor watershed conditions in order to assess the health of these environmental values.

<u>The sustainable use of timber and non-timber resources</u>

- Risks and uncertainty regarding all aspects of timber and non-timber resource planning would be reduced through more information regarding watershed values. Watershed analysis information, including equivalent clear-cut area, has a direct linkage to short term timber availability.
- Better knowledge of watershed values will support a more stable and predictable timber supply over the long term.

Relationship to Strategic Resource Plans and Decisions:

- CCLUP requires the special consideration of five key watersheds within the region, (page 160). Forest development plans, landscape unit plans and timber supply review across the entire region will all substantially benefit from improved information.

Cross Reference to Management Unit Issues (if applicable):

- Not applicable -This issue was identified and prioritized at the regional level.

Appendix 3: Template 2 – Knowledge Strategies

SSFM Issue #: 1A	Title: Landscape Level Biodiversity

Overview Description of the Knowledge Strategy:
The knowledge strategy will address the issue of landscape level biodiversity within the subcategories identified in Template 1. Although these components of the knowledge strategy will result in separate projects, the information gained must be used in concert to address landscape level biodiversity issues.

Seral Stage:

- New data will be collected regarding attributes of mature and old forests in selected ecosystems of the Cariboo Region to better assess seral conditions and to measure and manage CCLUP targets.
- Existing information will be compiled, analysed and modelled temporally.
- Improving the knowledge base around biodiversity will provide guidance for quantifying and measuring CCLUP biodiversity targets and setting harvest levels.

Patch Size:

- Because CCLUP and the Regional Biodiversity Strategy have identified the need for spatial based planning to achieve biodiversity targets, current information on harvesting history must be spatially analysed so that current patch sizes within BEC/landscape unit combinations are known.

Risk Management:

- New information regarding the nature and extent of the risk to meeting biodiversity targets due to priority harvest of MBP and PFT stands will be collected.

Stand Conversion:

- New information is required to understand the implications of species composition changes as ICH cedar hemlock stands convert to pine, spruce and fir after harvest.

Monitoring:

- As other knowledge building activities to address landscape level biodiversity take place, parallel monitoring programs will contribute new information as to how successful these strategies are in addressing CCLUP.

Status of Existing Knowledge:

Organisations:

- The CCLUP Biodiversity Conversation Strategy Committee has completed preliminary attribute definition work.

Inventory:

- Current harvesting history is available for patch size spatial analysis.
- Proposed landscape units are available.

- Some data required for a risk assessment is available, such as existing forest inventory and operational information regarding MPB and PFT susceptible stands. Projected harvest levels in these stands are also available.

Analysis:

- Patch size analysis has been completed for several draft landscape units by various agencies and licensees.
- Assess the benefits of defining seral stage based on attributes rather than age classes.

Research:

- Forest attribute definition work in mature and old forests in selected ecosystems of the Cariboo Region has been initiated through SSFM project 01-07.

Describe the Required Knowledge-Building Activities in these Areas

Inventory:

- Collect new information via a TEM/PEM project regarding seral stage information at the landscape and stand levels.

Analysis:

- Compile and graph existing digital age class information over time by LU, NDT and BEC to demonstrate how seral representation will be met through time.
- Complete patch size analysis on the remaining draft landscape units.
- Project the seral contribution of MPB and PFT stands over time.
- Assess proposed OGMAs for seral stage attributes

Research:

- Define forest attributes of mature and old forests in selected ecosystems within the Cariboo Region.
- Review alternatives to age classes for identifying old and mature.

Extension:

- Through pilot testing, develop an interpretation guide to interpret the results of patch size analysis.
- Assess how each district is currently addressing patch size so that consistent strategies can be developed and implemented.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Stand Level Biodiversity: There is a direct relationship between stand level and landscape level biodiversity.

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-3: CCLUP Biodiversity Strategy: Patch Size Analysis
- 01-5: Mature Plus Old and Old Seral Targets
- 01-7: Old and Mature Forest Attributes
- 01-8: Seral Contribution of MPB and PFTs

Lignum Projects

- LIG-5.1 – 5.4: Life Forms
- LIG-5.5: NDT Patterns
- LIG-5.7: Landscape Level Analysis
- LIG-6.2: Forest Planning
- LIG 9.2: MPB Plan
- LIG 9.3: Remote Sensing

SSFM Issue #: 1B	**Title:** Stand Level Biodiversity

Overview Description of the Knowledge Strategy:
The knowledge strategy for stand level biodiversity includes new information, analysis of existing data, as well as the extension, distribution and use of available information through demonstration sites. The knowledge strategy addresses the following sub-issues:

Attributes:

- Collect additional data regarding stand level biodiversity attributes such as CWD through inventory projects.

WTPs:

- Define desirable attributes within WTPs, including cavity-nesting sites.

Risk Management:

- Additional understanding is required regarding the risks associated with managing stand level biodiversity in the context of forest health issues.

Status of Existing Knowledge:

Inventory:

- CWD baseline information has been collected through the Vegetation Resources Inventory Phase Two Project.

Analysis:

- Wildlife structures are in place at the Viewland Demonstration site that can now be analysed regarding their success in creating the intended wildlife habitat features.

Research:

- Modification techniques to hasten the return of old attributes are known and described in the available literature.
- Techniques for the creation of old growth attributes have been demonstrated in coastal riparian forests and the information can be applied to this region where appropriate.

Describe the Required Knowledge-Building Activities in these Areas:

Organisation:

- The CCLUP Biodiversity Strategy Committee drives knowledge building activities related to biodiversity.
- The Viewland demonstration site has been established, thus management and organisation of this site should continue.

Inventory:

- Collect additional CWD data to determine retention and recruitment strategies.
- Collect new inventory data through a TEM/PEM project.

Analysis:

- Assess stand level structures at various intervals to determine if the techniques have been successful in creating the intended wildlife habitat features.
- Analyse CWD data collected through the Vegetation Resources Inventory for inclusion in TSR3.

Extension:

- Communication of known information regarding old forest attributes to forest managers through the demonstration site will extend stand level biodiversity information and encourage its use by local foresters.

Monitoring:

- Monitoring of the Viewland site for on-going effectiveness will be both a monitoring activity as well as an extension opportunity.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Landscape Level Biodiversity: There is a direct relationship between stand level and landscape level biodiversity.
- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.
- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-2: CWD Retention and Recruitment
- 01-6: Demonstration Site For Old Growth Attributes

Lignum Projects

- LIG-5.6: Stand Structure
- LIG-5.9: Cavity Nesting

SSFM Issue #: 2	**Title:** Mountain Caribou (East)

Overview Description of the Knowledge Strategy:
Better use of existing information combined with new data is required to address mountain caribou issues:

Habitat:

- The affects of access and predation on caribou habitat must be understood. Additional information is required in the areas of ICH adaptive management, forest health and monitoring, stand viability, silviculture, prescriptions, valuation and ecosystem management. The effects of treatments modelled through adaptive management on caribou habitat must be monitored.

Access:

- Knowledge is required regarding the effects of managing road and non-roaded access, seasonal access and road closures. This knowledge building should occur in conjunction with a public education program to address access knowledge gaps.

Predation

- Population monitoring as well as knowledge building in the area of wolf and moose population dynamics and their interaction with caribou is also part of this knowledge strategy.

Status of Existing Knowledge:
The following information is available:

- The Mountain Caribou Strategy, October 2000, prepared by the CCLUP Caribou Strategy Committee, contains important information and recommendations to address caribou habitat issues. Additional sources of information are detailed in the reference section, pages 71 to 73.
- Benchmark information on caribou population distribution, size, trends, and landscape level habitat use patterns has been collected for the Wells Grey North and Barkerville herds.
- Three radio telemetry studies have been conducted in mountain caribou ranges.
- A pilot and replicated research trial in the ESSF near Likely has been monitored since 1992.
- The Mt. Tom Adaptive Management project has been initiated and there is sufficient knowledge to progress into the adaptive management phase of testing the group selection silviculture systems on a large area.

Describe the Required Knowledge-Building Activities in these Areas:
This strategy is comprised of the following knowledge building activities:

Organisation:

- The CCLUP Caribou Strategy Committee was tasked with the development of a strategy for the mountain caribou herd, resulting in the report titled Mountain Caribou Strategy, presented in October 2000. The committee will continue to guide the knowledge building process for mountain caribou.

Inventory:

- On-going population surveys through a co-operative agreement with MELP to track radio-telemetry equipped caribou will provide a baseline understanding of the mountain caribou population and monitor the response to adaptive management trials.
- Establish adaptive management studies in additional biogeoclimatic zones to complement work completed in the ESSF.
- On-going vegetation response surveys within the adaptive management trial area will provide an understanding of how to maintain caribou habitat in harvested areas.

Analysis:

- Collect and analyse cost data associated with the use of alternative systems.
- Collect and analyse information necessary to consider area trades between combinations of modified and no harvest zones, and low and high elevation habitat areas.
- Study the affects of population dynamics and interactions between caribou, moose and wolves.
- Explore the topic of the causes of caribou mortality and determine juvenile survival rates.

Risk Assessment:

- A detailed risk assessment should be completed to determine the magnitude of various downward pressures on maintaining viable caribou populations.

Extension:

- Develop a new guidebook regarding modified harvest within mountain caribou habitat.
- Initiate a public education program regarding access issues such as road closures and seasonal road use and their relationship to the maintenance of quality caribou habitat.

Monitoring:

- Knowledge gained from pilot and replicated research phases of the Mt. Tom adaptive management trial will allow progression into an adaptive management phase of testing group selection silviculture systems on a larger area.
- Continued monitoring of caribou habitat use is required to adjust strategies in a process of continued improvement.
- Monitoring of wolf habitat use and foraging strategy in relation to timber harvesting and road development is necessary.
- Develop prescriptions that will allow the flexibility necessary to adjust WTP location

during harvesting operations within an ICH adaptive management project. Monitor the results of these prescriptions on mountain caribou habitat.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Northern Caribou: Knowledge built as part of the northern caribou issue can be applied where appropriate to increase the understanding of mountain caribou.

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-12A: Mt. Tom Adaptive Management Trial
- 01-13-1: CCLUP Cariboo Strategy: Population Monitoring
- 01-13-2: CCLUP Cariboo Strategy: Mt. Tom – Population Monitoring

SSFM Issue #: 3	**Title:** Northern Caribou - West

Overview Description of the Knowledge Strategy:
Better use of existing information combined with new data is required to address northern caribou issues:

Habitat:

- The affects of access and predation on caribou habitat must be understood. Additional information is required under the general habitat topics of forest health, stand viability, silviculture, timber enhancement, and lichen. Knowledge gaps related to modified harvest include prescriptions, mistletoe, ecosystem management and valuation. As well an investigation of the Dean River migration corridor will enhance current understanding of habitat requirements. The affects of treatments on caribou habitat as modelled through adaptive management must be monitored.

Access:

- The existing knowledge regarding management of road and non-roaded access, seasonal access and road closures must be incorporated into an effective access management strategy. A public education program would enhance the application of this knowledge base.

Predation:

- Population monitoring as well as knowledge building in the area of wolf and moose population dynamics and their interaction with caribou is also part of this knowledge strategy.

Status of Existing Knowledge:
The following information is available:

- The Mountain Caribou Strategy, October 2000, prepared by the CCLUP Caribou Strategy Committee, contains information that may also be applied to the northern caribou herd. Additional sources of information as detailed in the reference section, pages 71 to 73, may also be applicable to northern caribou.
- Benchmark information on population distribution, size, trends, and landscape level habitat use patterns has been collected for the northern caribou herds based on telemetry studies.
- West Caribou Kapan Telemetry Project is in progress, with a planned completion date of March 2002.
- 2000 hectares of modified harvest practices and adaptive management alternative silviculture systems trials are in place on Satah and Baldface Mountains.

Describe the Required Knowledge-Building Activities in these Areas:
This strategy is comprised of the following knowledge building activities:

Organisation:

- The CCLUP Caribou Strategy Committee was tasked with the development of a strategy for the northern caribou herd. A report including recommendations is

expected to be complete by December 2001. The committee will continue to guide the knowledge building process for northern caribou.

Resource Inventory:

- On-going population surveys will provide a baseline understanding of the northern caribou population and monitor the response to adaptive management trials.
- On-going vegetation response surveys within the adaptive management trial area will provide an understanding of how to maintain caribou habitat in harvested areas.

Analysis:

- Collect and analyse cost data associated with the use of alternative silviculture systems.
- Determine alternatives for prescriptions within modified harvest areas.
- Study the affects of population dynamics and interactions between caribou, moose and wolves.
- Explore the topic of the causes of caribou mortality and determine juvenile survival rates.

Research:

- Research the location and growth patterns of arboreal and terrestrial lichens.

Risk Assessment:

- A detailed risk assessment should be completed to determine the magnitude of various downward pressures on maintaining viable caribou populations.

Extension:

- Develop a new guidebook regarding modified harvest within northern caribou habitat.
- Initiate a public education program regarding access issues such as road closures and seasonal road use and their relationship to the maintenance of quality caribou habitat.

Monitoring:

- Knowledge gained from pilot and replicated research phases of the adaptive management trials will allow progression into an adaptive management phase of testing group selection silviculture systems on a larger area.
- Continued monitoring of caribou habitat use is required to adjust strategies in a process of continued improvement.
- Monitoring of wolf habitat use and foraging strategy in relation to timber harvesting and road development is required.
- Develop prescriptions that will allow the flexibility necessary to adjust prescriptions through operational decisions. Monitor the results of these prescriptions on northern caribou habitat.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Mountain Caribou: Knowledge built as part of the mountain caribou issue can be applied where appropriate to increasing the understanding of northern caribou.
- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.
- Monitoring Issues: Strategies, systems and processes that have initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2001 Resource Management Plan

- 01-12B: Satah-Chezecut Adaptive Management
- 01-13-1: CCLUP Cariboo Strategy: Population Monitoring
- 01-13-3: CCLUP Cariboo Strategy: Charlotte Aplands Herd - Population Monitoring
- 01-13-4: CCLUP Cariboo Strategy: Monitoring of Habitat Use

SSFM Issue #: 4	Title: Information Management

Overview Description of the Knowledge Strategy:
The knowledge strategy is to determine new methods of integrating and formatting all available inventory information to facilitate access to data, data sharing, data integrity and timely decision making. The strategy is focussed on the sub-issues within the information management issue.

Availability and Distribution:

- Formulating existing information into communication ready formats will improve its availability and distribution.

Standards:

- Development of data standards will enhance data integrity and ease data set linkages and analysis.

Maintenance:

- Maintenance of existing data by a data custodian will ensure that existing information is catalogued and available for use in analysis, planning and decision making.

Inter-Planning Level:

- Improved availability, common standards and data maintenance will allow for the analytical use and interpretation of data for input into multiple planning processes.

Status of Existing Knowledge:

- A substantial amount of inventory and other forestry related information is available in various formats.
- Output from RMP 01-38, Resource Information Management Framework, is expected to be completed for the Horsefly District in 2003/2004.
- Provincial data standards, such as INCOSATA have been developed by RIC.
- The Southern Interior Forest Extension Research Partnership (SIFERP) is working on the "Natural Resource Information Network".

Describe the Required Knowledge-Building Activities in these Areas:
Organisation:

- Stakeholders should jointly determine a data custodian role and identify formats and systems that meet local and provincial requirements.
- TESC will provide data custodianship for strategic planning functions

Analysis:

- Determine the appropriate data format and systems for the majority of users needs.
- Integrate current data into the appropriate format for analysis.
- Access and distribution of data needs to be improved.

- Valuable but non-conforming data needs to be identified.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- All other SSFM Issues: Knowledge built through this strategy will affect the deliverables and process of knowledge building within every other issue of strengthening sustainable forest management.

- Monitoring Issues: Enhanced information management facilitates the monitoring of CCLUP targets.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-22: Digital Roll-Up Fish Inventory
- 01-38: Resource Information Management Framework
- TESC # 2.1.1, 2.2.1 and 2.3.1 (Spatial Data Set)

SSFM Issue #: 5	Title: Integration Direction

Overview Description of the Knowledge Strategy:
The knowledge strategy to address integration involves both more effective uses of existing information as well as new analysis. Knowledge gained and utilised through this strategy will test the ability of strategic sub-regional planning to meet CCLUP targets through a regional roll-up initiative.

Status of Existing Knowledge:

- The CCLUP documents, including the CCLUP Integration Report, contain targets and expectations linked to both regional and sub-regional resource values.
- While operational plans are consistent with these targets and expectations, and sub-regional planning processes are designed to be consistent with these targets and expectations, there has been little testing of this consistency to date.
- Methods to test consistency have not been fully developed.
- Sub-regional planning processes are either on going or completed in every portion of the region.
- Adequate inventory and research information exists to move towards a testing initiative.
- The Inter-Agency Management Committee and the Regional Resource Board are in place.

Required Knowledge-Building Activities in these Areas:

Analysis

- After developing evaluation criteria, the working group will analyse the subject sub-regional process and present findings.
- Advanced organisation, synthesis and analysis tools may be required.
- A test of a SRP's ability to meet CCLUP targets is required.

Extension:

- Processes and results will be referred to the public for information and feedback.

Monitoring:

- Because the individual sub-regional plans are at different stages of completion, monitoring their ability to meet CCLUP objectives in aggregate will be completed over time.

Performance Indicators, Targets & Milestones:

- The products of sub-regional planning processes will be evaluated against the CCLUP prior to government approval and implementation of the plans. Targets and milestones associated with the roll-up and testing are therefore dependent on sub-regional plan timelines. Only under the most extreme circumstances will the roll-up

and testing process delay implementation of the sub-regional plan.

- Refer to attached template 3 activity descriptions

Describe Relationship to Other SSFM Knowledge Strategies:

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Model: Monitoring the effectiveness of SRPs in achieving CCLUP targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- TESC # 2.1.3, 2.2.3 and 2.3.3 (CCLUP modelling)

Lignum's Projects

- LIG 8.1: Sub-Regional Planning

SSFM Issue #: 6	Title: Mule Deer Winter Range Management

Overview Description of the Knowledge Strategy:
A knowledge strategy to assist resolution of Mule Deer Winter Range issues must incorporate information regarding the current and future states. All new information gathered and analysed with existing information is designed to feed into the development of management plans for each MDWR.

Current State:

- A continuation of current state inventory information building will provide a baseline situation for management prescriptions. Current stand structure information must be mapped and MDWR boundaries rationalised. Improved inventory information about current conditions will feed into the management process.

Future State:

- Modelling of existing and new inventory information is required to understand the future state of MDWRs and to develop long-term plans for the individual ranges.

Management:

- Develop new methodologies for completing management strategies within the ranges and monitor the results of these strategies. MDWR management plans must be completed for all ranges to guide development and expedite cutting authority approvals.

Status of Existing Knowledge:
Organisation:

- CCLUP MDWR Strategy Committee
- The MDWR Working Group

Inventory:

- External MDWR boundaries are mapped and field verified.
- Stand structure mapping has been completed for 23 of 100 ranges.
- Analysis zoning has been completed for 13 of 100 ranges.

Analysis:

- A study site for deep snow pack MDWR harvest systems is located at Viewland Mountain. Pre-harvest data collection began in 1996 and harvesting is now complete.
- A management plan, including the development of objectives, has been completed for 1 out of 100 ranges.

Extension:

- "Recommended Interim Management Guidelines for Mule Deer Winter Range".
- "Handbook for Timber and Mule Deer Management Co-ordination on Winter Ranges

in the Cariboo Forest Region".

- "Structural Definitions for Management of Mule Deer Winter Range Habitat in the IDF".

Describe the Required Knowledge-Building Activities in these Areas:

Inventory:

- Collect information on Douglas-fir natural regeneration dynamics and the environmental conditions required for re-establishing even-aged Douglas-fir stands in the ICHmk3.
- Gather additional information on mule deer use of wetbelt and transition winter ranges as well as the habitat conditions and silviculture systems within these eastern ranges.
- Complete stand structure mapping for the remaining MDWRs, including mapping of the accurate measurable attributes important to mule deer in order to supply information to the management plan process.
- Refine internal MDWR boundaries through continued process input and additional field and mapping information.
- Determine stand types within MDWR where commercial thinning and juvenile spacing opportunities exist.
- Ground forage studies are required.
- Mule deer population information is required.

Analysis:

- Develop ecologically appropriate silviculture systems for even-aged Douglas-fir stands in the deep snow winter ranges of the ICHmk3.
- Complete analysis zoning for the remaining ranges.
- Develop guidelines for long-term timber access in mule deer winter ranges.
- Determine the economic viability of current prescriptions for MDWR, through timber access levels proposed in the Mule Deer Winter Range guidelines.
- Model operations as prescribed in the guidelines over time.

Strategy Development:

- Develop the objectives for the remaining ranges.
- Propose development within a MDWR in a forest development plan as a pilot study of MDWR operational planning processes.

Monitoring:

- Monitor the Viewland Mountain pilot study.
- Monitor existing practices in Mule Deer Winter Ranges.

Extension:

- Update the Mule Deer Handbook to include very deep snowfall MDWRs.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Timber Access Targets: Prescriptions developed will affect timber access targets.
- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the Information Management issue knowledge strategy.
- Monitoring Issues: Strategies, systems and processes that have been previously initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-09: Silviculture Systems for Fdi with very deep snowfall at Viewland Mountain.
- 01-10: MDWR Management Plans
- 01-11: Mule Deer and Silviculture Systems on Wetbelt Winter Ranges
- TESC # 6.1.1 (Prognosis Implementation)

Lignum Projects

- LIG 5.8: MDWR Alternative Approach and IFPA area

SSFM Issue #: 7	Title: Strategic Timber Access Targets

Overview Description of the Knowledge Strategy:
The knowledge strategy required to support achievement of CCLUP timber access targets contains four components.

Long-term:

- Existing inventory information will be used in analysis procedures to model and test options to achieve long-term timber access targets.

Modified Harvest:

- Further refining of some modified harvest methods is necessary before they can be implemented operationally. Exploring new modified harvest methods will also occur.

Forest Health:

- New information will continually be collected, specifically regarding the impacts of current forest health issues and how they affect the achievement of timber access targets.

Short-term:

- Analysis activities will utilise existing data to determine methods to achieve short-term timber access targets.

Status of Existing Knowledge:
The current inventory and TRSII dataset contain existing knowledge that can be applied to measurement of timber access targets.

Describe the Required Knowledge-Building Activities in these Areas:

Organisation:

- The TESC will initiate projects designed to build knowledge around timber access targets.

Research:

- Consistent with the CCLUP definition of 'no harvest areas' on page 11 of the implementation report, "some of these areas are expected to become available in the future provided that retention of the other resource values, particularly wildlife, can be ensured". An options paper is required to identify alternate harvesting processes that would allow access to 10% of no harvest areas.

Monitoring:

- Monitoring of short and long-term timber access targets, including the affects of various factors on their achievement, is required to ensure they are met.
- The short-term timber availability plan should be re-assessed and monitored as the

SRP process progresses.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the achievement of timber access targets is a component of monitoring the land use plan.

Cross Reference to Management Unit Activities

TESC Projects

- TESC 1_1: Work Plan
- TESC 2_1: Spatial Dataset
- TESC 2_3: CCLUP Estate Analysis

SSFM Issue #: 8	Title: Timber Supply Review

Overview Description of the Knowledge Strategy:
This knowledge strategy is composed of four sub-strategies and is designed to ensure that timber supply analyses are supported by the best information possible.

Inventory:

- The collection of new inventory information, as well as the enhancement or update of existing inventory information, will add to the timber supply review data set.

Baseline Growth and Yield:

- New information will be collected and combined with existing data to support the development of operational adjustment factors.

Productive Land Base:

- An assessment of net-downs pertaining to the productive land base is required to test assumptions.

Analysis Model:

- The knowledge strategy involves a more effective use of existing data through additional analysis and assumption modelling. Testing these assumptions will ensure they are appropriate for the TSR process.

Status of Existing Knowledge:

Organisation

- The TESC Committee manages many projects related to the timber supply review dataset.
- The Cariboo Site Productivity Working Group is in place.

Inventory

- The existing forest inventory is the starting point for further inventory and TSR work.
- The Williams Lake VRI project is in year 4, with approximately 400 plots established.
- There is a large dataset of growth and yield information for even-aged natural stands.

Analysis

- The timber supply review process has existing assumptions.
- Previous timber supply reviews have used provincial averages for Operations Adjustment Factors

Describe the Required Knowledge-Building Activities in these Areas:

Organisation:

- The Cariboo Site Productivity Working Group is in place.
- The TESC committee is tasked with co-ordinating knowledge building activities related to timber supply review.
- An inventory strategy should be developed to set priorities and guide the enhancing, updating or expanding of the existing inventory information set.

Inventory:

- Further growth and yield information is required in natural and managed uneven-aged stands and in even-aged managed stands.
- A maintenance program is required for growth and yield data in even-aged natural stands.
- Collect further inventory information through VRI sampling for incorporation into timber supply review.
- An inventory of the true width and area of roads and landings in the region is required to refine the road netdown process.

Analysis:

- Timber supply review assumptions require validating through testing, analysis and monitoring.
- The performance of problem forest types and mountain pine beetle damaged stands must be measured, analysed and incorporated into timber supply review.
- Determine species-specific inventory adjustment factors to adjust current inventories.
- Regional operational adjustment factors must be developed for each TSA to refine the net down during timber supply review.
- Test the overlaps of non-timber values that occur in riparian management zones to refine inputs to TSR and planning processes.

Monitoring:

- Long term monitoring of the landing rehabilitation project, which is now the responsibility of the MOR Regional Research section, is required.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities :
2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-01: Uniform Shelterwood Systems for Fdi/Pl in SBSdw1
- 01-21: Riparian Buffer Sampling
- 01-33A: VRI - Quesnel TSA (Phase II)
- 01-33B: VRI – Williams Lake TSA (Phase II)
- 01-33C: VRI - 100 Mile House TSA (Phase II)
- 01-34: VRI - TFL5
- 01-36: Area of Roads and Landings for TSR Net Downs
- 01-40: Monitoring of Rehabilitated Landings
- 01-41: G&Y PSP Maintenance
- 01-42: G&Y PSP Re-measurements
- 01-43: OAF Study for TIPSEY
- 01-44: Terrain Stability Mapping
- 01-45: Terrestrial Ecosystem Mapping
- 01-48: Root Rot Predictor Model

TESC Projects

- TESC 2_2: TSRII Calibration
- TESC 4.1.1 Maintain Harvest Levels
- TESC 7.1.1 Roads, trails and landings survey

SSFM Issue #: 9	Title: Timber Enhancement

Overview Description of the Knowledge Strategy:
The knowledge strategy required to address the timber enhancement issue depends upon new analysis designed to model the affects of timber enhancement on achieving CCLUP targets. This analysis will utilise new and existing data.

Timber Access:

- Opportunities to increase timber access through timber enhancement, while maintaining other non-timber targets, must be identified.
- Initiating pilot projects and analysing results will build the required knowledge to assess the potential impacts of enhancement techniques on timber access.

Growth and Yield:

- Additional information via the statistical analysis of growth and yield data will be applied to enhancement strategies.

Forest Health:

- New information is required regarding the affects of forest health agents on managed stands.

Modelling:

- An optimisation model should be developed to test opportunities to maximise benefits to both timber and non-timber resources through enhancement activities.

Inventory:

- Improving existing inventory information will increase certainty around the relationship between inventory information, enhancement activities and timber access targets.

Status of Existing Knowledge:
Existing knowledge gained through projects initiated by TESC will be available at the end of this fiscal year.

Describe the Required Knowledge-Building Activities in these Areas:

Organisation:

- The TESC committee has been charged with many of the knowledge building activities surrounding timber enhancement.

Inventory:

- Gaps in growth and yield data within natural uneven-aged and managed (both even and uneven-aged) stands should be filled.

Analysis:

- Modelling the affects of timber enhancement activities on timber access targets is required.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Timber Access Targets: Enhancement strategies will be monitored relative to their affect on timber access targets.

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities :

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-39: TESC: Timber Enhancement Strategy Committee

TESC Projects

- TESC 3.1.1: Summary Information
- TESC 3.1.1 Inventory profile analysis

SSFM Issue #: 10	Title: Fish Values

Overview Description of the Knowledge Strategy:
This knowledge strategy will provide additional information on specific fish populations and their distribution in areas where forest harvesting is underway or planned. New information will then be integrated with existing knowledge for use in regional and area-specific planning processes. Increased distribution and use of existing information will also be facilitated through a digital roll-up of current fish inventory and fish habitat inventory data.

Status of Existing Knowledge
Considerable fish and stream information has been collected through Forest Practice Code requirements of operational activities. Agencies and licensees have collected additional fish inventory and fish habitat inventory information. The results of these two levels of data collection have yet to be combined into one data source that can be accessed by all interested parties. The FHAT (Fish Habitat Assessment Tool) was developed to provide predictive watershed wide fish distributions, for planning purposes.

Examples of existing knowledge built through previous RMPs include:

- Intensive studies on bull trout in the Cariboo Region have been carried out on stocks in the upper Chilko River and Chilko Lake areas.
- Weldwood has completed a directed study on Bull Trout in the Little River.

Describe the Required Knowledge-Building Activities in these Areas:

Inventory:

- Intensive fish inventories will provide information regarding temperature sensitive streams, specific spawning times and locations, habitat conditions and population.
- Fish presence or absence inventories are required.
- Fish inventory 1:20,000 maps are required for whole watersheds detailing fish species, their characteristics, distribution and relative abundance.
- A fish habitat inventory related to stream reach and lake biophysical data for interpretation of habitat sensitivity and capability for fish production is required at the watershed level.
- Winter limnology projects are required to complete lake inventory and classification efforts.

Analysis:

- The habitat parameters for bull trout require definition.

Extension:

- Provide access to existing fish and stream information via a collation of all data

available in a format that is useable and accessible so existing information can be utilised in strategic and operational planning processes.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Watershed Values: Fisheries values are directly related to watershed values.
- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.
- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in addressing SSFM issues is required.

Cross Reference to Management Unit Activities :

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-21: Riparian Buffer Sampling
- 01-22: Digital Roll-up Fish Inventory
- 01-24C: Lakes Classification
- 01-49: Reconnaissance 1:20,000 Fish and Fish Habitat Inventory

SSFM Issue #: 11A	Title: Monitoring Model

Overview Description of the Knowledge Strategy:
An appropriate method of monitoring the implementation and achievement of CCLUP targets will be found via this knowledge strategy. The existing provincial monitoring model will be tested using existing information in the Cariboo Region. An alternative 'Made in the Cariboo' model will be developed and tested.

Status of Existing Knowledge:

- The Land Use Co-ordination Office has released the provincial monitoring model.
- Early analysis of the provincial model suggests it may not be appropriate for the complexity of the Cariboo Region and CCLUP.

Describe the Required Knowledge-Building Activities in these Areas:

Analysis:

- Using existing information, test the "Provincial Model" for appropriateness in monitoring a regional land use plan.
- Using existing information, test the "Cariboo Model" for appropriateness in monitoring a regional land use plan.

Research:

- Develop a "Made in the Cariboo" model for monitoring regional land use plans.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Integration Direction: A monitoring model that adequately addresses a regional land use plan must integrate the output of all SRPs within the CCLUP area.

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

Cross Reference to Management Unit Activities:
2002/2003 Resource Management Plan

Lignum Projects

- LIG 7.2: Adaptive Management Principles and Monitoring Plan

SSFM Issue #: 11B	**Title:** Monitoring the RMP and Strengthening Sustainable Forest Management

Overview Description of the Knowledge Strategy:
The SSFM component of the RMP must be monitored to ensure that individual projects were completed as per the contract specifications, and that each project contributed to the knowledge strategy and hence the resolution of the SSFM issue.

Successful implementation of the RMP involves achievement of activity level objectives in the three primary components, SH, EEV and SSFM. Effectiveness is a measure of how well implemented knowledge strategies address issues identified in the SSFM. The knowledge strategy for monitoring must create information that confirms that implementation and effectiveness were achieved.

RMP Implementation Monitoring

- Activities must be monitored to ensure they were successfully implemented.

SSFM Effectiveness Monitoring

- The SSFM component of the RMP must be monitored to ensure that the outputs of all activities in aggregate contribute towards issue resolution.

Status of Existing Knowledge:

- FRBC has financial auditing procedures in place.

Describe the Required Knowledge-Building Activities in these Areas:

- Develop administrative processes to ensure project completion and success.
- Develop a process to determine if the SSFM component of the RMP contributes to addressing the identified issues.
- Determine performance indicators and reporting methods for both implementation and effectiveness.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- All other SSFM issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

SSFM Issue # 12	**Title:** Other Wildlife and Species at Risk

Overview Description of the Knowledge Strategy:
This strategy will include additional inventory information regarding both the habitat and populations of species at risk and other wildlife. Much of this new information will be additional data for on-going population projects. Existing and new information will also be utilised in analysis activities and incorporated into management prescriptions and decision-making processes.

Status of Existing Knowledge:

Inventory

- First and second year furbearer snow tracking information from established locations in various biogeoclimatic zones in the Anahim Lake area is available.
- Some TEM products are currently under development for grizzly bear habitat information, and TEM mapping is complete in a small proportion of mountain goat habitat.
- Baseline mountain goat summer inventory information is available for over half of the inventory units in both the east and west mountain ranges of the Cariboo regions, but only a small percentage of the inventory units have winter inventory information.
- Aerial inventory population data is available for most areas inhabited by moose in the Cariboo region.
- Wetlands have been classified on approximately 20 – 1:20 000 mapsheets and these have been inventoried within the past 5 years.
- Preliminary radio-telemetry work has indicated that wetlands are key moose habitat.
- Red and Blue Listed Species Inventories have occurred in the Taseko Management Zone and the Moffat Area.

Describe the Required Knowledge-Building Activities in these Areas:

Inventory:

- Continue to collect inventory information where it is required to gain an understanding of wildlife and species at risk so that forest and land management prescriptions can address conservation.
- Collect furbearer snow tracking data at established transect locations as part of an established project near Anahim Lake.
- Conduct a baseline population inventory of mountain goats throughout the region.
- Conduct TEM for both grizzly bear and mountain goat habitat areas.
- Locate and map critical mountain goat habitats including key natal sites and winter ranges.
- Continue updating wetland classification mapping.

- Conduct aerial inventories in select areas to assess species at risk population parameters.
- Specific fish inventories are required to identify and characterise species and populations at risk and to determine the measure required to protect critical habitats of those species that have been designated as identified wildlife under the Code.
- Inventory information regarding Bull Trout and Kokanee in particular is required.

Analysis:

- Use existing and new wildlife inventory information to develop and refine strategies for incorporating the conservation of wildlife and species at risk into forest and land management initiatives.
- Develop landscape measures for maintaining furbearer habitat that can be incorporated into forest harvesting plans.
- Develop criteria to identify wetland and riparian habitat important to moose, especially during the winter period.
- Analyse the impact of forest harvesting on wetland use.
- Develop moose-forest harvest management strategies, such as requirements for forested buffers on wetlands.

Research:

- Build new knowledge regarding the use of wetland perimeters, thermal and security cover requirements, calving site selection and the association between wetland type and moose use.

Monitoring:

- Monitor the mountain goat population to ensure that mitigation measures are adequately sustaining the herd's population and health.
- Monitor moose habitat selection and movement patterns relative to wetlands via GPS collars and winter trailing.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Stand Level Biodiversity: Issues and subsequent management strategies explored and demonstrated through the Old Growth demonstration site in the Horsefly District may assist in the development of strategies to address species at risk. Specifically, blue listed species such as fisher and wolverine use characteristics of old forest habitat.

- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.

- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:
2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-4: Inventory of Red and Blue Listed Species and their Habitats, Rare Plants and Rare Ecosystems
- 01-14: Furbearer Inventory
- 01-15: Grizzly Bear Population and Habitat Inventory
- 01-16: Mountain Goat Habitat and Animal Inventory
- 01-17: Moose Strategy
- 01-18: Riske Creek Waterfowl Habitat Study

SSFM Issue #: 13	Title: Watershed Values – Assessment of Watershed Integrity

Overview Description of the Knowledge Strategy:
The affects of previous watershed restoration work will be monitored to ensure that the desired affects were achieved through the methods used. Previous information collected will be expanded upon through continued suspended sediment sampling and water quality sampling. New information will be collected through terrain stability mapping and determining linkages between watershed quality and other factors.

Status of Existing Knowledge:

- Previous suspended sediment data is available for the Horsefly River from 1994-2000.
- Two years of water quality and quantity information is available for Penfold Creek.
- Watershed assessments have been completed in selected buckets.
- Sediment source survey mapping is available in selected buckets.
- Terrain stability mapping has been completed in selected buckets.
- Suspended sediment sampling has occurred at a variety of locations through the spring and summer of every year since 1994.
- A Needs/Gap Analysis for hydrometric and water quality stations in the Cariboo Region was completed in 1998.

Describe the Required Knowledge-Building Activities in these Areas:

Inventory:

- Establish a Horsefly River sediment baseline to enable the detection of future changes in sediment concentrations.

Analysis:

- Determine linkages between suspended sediment and natural and human factors.
- Characterise suspended sediment concentrations at various locations in the Horsefly River drainage under current and future land use conditions.
- Assess and characterise suspended sediment concentrations for natural, harvested and agricultural areas.

Research:

- Investigate cost-effective watershed monitoring equipment options.

Monitoring:

- Continue the monitoring program on the Horsefly River, including periodic sampling, analysis, reporting and data management of water samples and suspended sediment data at all six stations on the Horsefly River and five stations on tributaries.

- A monitoring program for watershed monitoring stations is required to add a specific increment of new knowledge each year.
- Monitor water quality and quantity in response to operational forestry activities to identify future road development and harvesting options.

Define Performance Indicators, Targets & Milestones:

- Refer to attached Template 3 activity descriptions.

Describe Relationship to Other SSFM Knowledge Strategies:

- Fish values: Watershed monitoring is directly related to fish values.
- Information Management: Knowledge built through this strategy will conform to standards developed regarding distribution, maintenance and use of data within the information management issue knowledge strategy.
- Monitoring Issues: Strategies, systems and processes that have been initiated must be monitored to ensure project objectives are met. Monitoring the effectiveness of these strategies in achieving land use plan targets is required.

Cross Reference to Management Unit Activities:

2002/2003 Resource Management Plan

2001/2002 Resource Management Plan

- 01-25: New Watershed Monitoring Station at Deception Creek
- 01-26: Horsefly River Sediment Monitoring
- 01-27: Penfold Creek Monitoring
- 01-28: Automated Water Monitoring Network
- 01-29: Predictive Model for Stream Shade

Appendix 4: Template 3 Activity Descriptions

Activity Number	Project Name	2002/2003 Investment
RMP-02-1	Terrestrial Resource Inventory Mapping (TRIM 2)	500,000
RMP-02-2	Timber Enhancement Strategy Development for the Cariboo Region	500,000
RMP-02-3	Biodiversity Strategy: Patch size, old targets and seal contributions	100,000
RMP-02-4	Old and Mature Forest Attribute Definition	50,000
RMP-02-5	CCLUP Caribou Strategy – Objectives, targets and monitoring of caribou populations and habitat use	235,000
RMP-02-5A	Caribou Habitat Mount Tom Adaptive Management Trials	50,000
RMP-02-5B	Caribou Habitat Satah Mountain Adaptive Management Trials	26,400
RMP-02-6	CCLUP Caribou Strategy - Monitoring of Wolf Habitat Use and Foraging Strategy	120,000
RMP-02-7	1:20,000 Fish and Fish Habitat Inventory	335,000
RMP-02-8	MDWR Management Plans	180,000
RMP-02-9	Inventory of Red and Blue Listed Species and Their Habitats, Rare Plants and Rare Ecosystems	100,000
RMP-02-10	Digital Roll-up Fisheries Inventory	30,000
RMP-02-11	CCLUP Moose Strategy	130,000
RMP-02-12	Grizzly Bear Population Inventory and Habitat Inventory	200,000
RMP-02-13	Adaptive Management Trial of the Mountain Caribou Strategy	40,000
RMP-02-14	Prognosis Model Development	167,000
RMP-02-15	Evaluate Natural Disturbance Type (NDT) Patterns	50,000
RMP-02-16	Stand Structure and Seral Stage Definitions	150,000
RMP-02-17	Managed Stand Growth and Yield (MSGY) Program	100,000
RMP-02-18	Forest Health Remote Sensing Research	25,000
RMP-02-19	Net Volume Adjustment Factor - WLTSA	75,000
RMP-02-20	Cariboo-Chilcotin Furbearer Inventory	90,000
RMP-02-21	Uniform Shelterwood Systems for Even-Aged Douglas-fir/Lodgepole Pine Stands in the SBSdw1 Subzone	40,000
RMP-02-22	Growth and Yield Permanent Sample Plot (PSP) Re-measurement in the Cariboo Forest Region	120,000
RMP-02-23A &23B	Mountain Goat Strategy	60,000
RMP-02-24	Inventory Strategy - All Resources	40,000
RMP-02-25	Winter Limnologies	10,000
RMP-02-26	Pine Bark Beetle Infestation Monitoring	100,000
RMP-02-27	Bull Trout Intensive Inventory	150,000
RMP-02-28	Resource Information Management Framework	35,000
RMP-02-29	Development of a Predictive Model for Stream Shade	19,000
RMP-02-30	Silvicultural Systems for Douglas-fir Stands on Very Deep Snowfall Mule Deer Winter Ranges in the Cariboo Forest Region	36,000
RMP-02-31	Riske Creek Waterfowl Habitat Study	5,500
RMP-02-32	SSFM Performance Monitoring	3,000
RMP-02-33	Communication/Distribution	37,000
RMP-02-34	Monitoring Site Index	70,000
RMP-02-35	Phase II Vegetation Resources Inventory Plots - TFL 52	180,000
RMP-02-36	Modified Harvest Valuation Discussion Paper	15,000

RMP-02-37	Short Term Timber Access	250,000
RMP-02-38	SP Pilot Study for Modified Harvest Areas	15,000
RMP-02-39	Management Guidelines for Douglas-fir Stocking Densities to Integrate Tree Growth, Biodiversity Objectives and Forage Production in the IDF	15,000
RMP-02-40	Change Monitoring Inventory	70,000
RMP-02-41	Managed Stand Plots For Growth and Yield	50,000
RMP-02-42	Monitoring Stand Level Forest management on Mule Deer Winter Ranges	20,000
RMP-02-43	Increasing Our Knowledge of the Life Cycle of Dead Wood	17,000
RMP-02-44	Lake Inventory	100,000
RMP-02-45	Terrain and Terrain Stability Classification in Selected Areas of the Cariboo Forest Region	25,000
RMP-02-46	Spacing Trial	35,000
RMP-02-47	Quesnel Lake North Arm Water Quality/Quantity Monitoring Program: Penfold Watershed	50,000
RMP-02-48	Automated Watershed Monitoring	86,410
RMP-02-49	MDWR Merchantability Pilot/Study	100,000
RMP-02-50	SIBEC Plots	25,000
RMP-02-51	Operational Adjustment Factor (OAF) Study for TIPSY	180,000
RMP-02-52	Quesnel Lake Kokanee	75,000
RMP-02-53	Growth and Yield Permanent Sample Plot Maintenance throughout the Cariboo Forest Region	15,000
RMP-02-54	Vegetation Resource Inventory - Phase II 100 Mile House TSA	150,000
RMP-02-55	Mule Deer Population Inventory	60,000
RMP-02-56	Lake Classification	56,000
RMP-02-57	Incorporate the Impacts of Insects and Diseases into Ecosystem Management Planning	20,000
RMP-02-58	IFPA Mountain Pine Beetle Management Plan	60,000
RMP-02-59	Landscape Level Planning	150,000
RMP-02-60	Timber Enhancement Area Pilot	25,000
RMP-02-61	Landing and Road Rehabilitation Operational Trial	35,000
RMP-02-62	Pilot Management Units in Fir	30,000
RMP-02-64	SBS-ESSF Old Growth Attributes	120,000
RMP-02-65	Monitoring MPB Infested Stands	50,000
RMP-02-66	Northern Caribou 80/20 Lichen Operations Decisions	10,000
RMP-02-67	Mountain Caribou Population Dynamics	10,000
RMP-02-68	Caribou/Moose/Wolf Population Dynamics Study	25,000
RMP-02-69	MDWR OGMA Prescription	15,000
RMP-02-70	Barriers (biological) to High/Moderate Crown Closure Capability Habitat	15,000
RMP-02-71	MDWR Timber Access Target Pilot/Study	30,000

SSFM Issue # Off Strategy	Terrestrial Resource Inventory Mapping (TRIM 2)	RMP-02-1

Summary:
The project is a continuing multi-year project. A steering committee of licensees and Ministry staff has been established to set year-to-year work priorities. The project has several prime steps:

- Acquire 1:40,000 black and white photos of the project area.
- Complete aerial triangulation to geo-reference the photos
- Scan the photos to produce digital images.
- Remove parallax from the digital images using the digital terrain model from TRIM I.
- Drape TRIM I over the digital images and digitise new features or correct old ones.
- Produce 1:20,000 TRIM II and orthophotos.
- Geographic Data BC will provide technical advice and quality control.
- The entire region will be completed.

Status:
Existing ongoing project

Objectives:
- The TRIM II maps will provide an accurate and up-to-date base for planning and monitoring CCLUP and FRBC activities

Describe Tasks, Deliverables, Targets and Milestones:
- 1:20,000 Terrain Resource Inventory Map digital files and orthophotos.
- Expected to be completed by March 31, 2004 provided there are no delays due to weather (inability to acquired aerial photography).

Cost Sharing: NA

Partnerships:
- Agencies (MOF, MSRM and WLAP) as well as the Cariboo Region Multi-Year Agreement Holders form a stakeholder steering committee.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
1,117,000	3	500,000	250,000	0	0	0	1,867,000	5

SSFM Issue #9	Timber Enhancement Strategy Development for the Cariboo Forest Region	RMP-02-2

Summary:

Timber Enhancement targets were not included in the CCLUP or the subsequent 90-day implementation report. These were to be developed in the ongoing process of implementing the Land Use Plan.

The Regional Manager of the Cariboo Forest Region established a joint MOF/industry Timber Investment Strategy committee (TISC) to identify silviculture investment opportunities for Forest Renewal BC. Interim investment opportunities and estimated impacts were developed in 1995. Subsequent to this local TISC (at the TSA level), committees were established to develop TSA level investment strategies. These groups to estimate forest estate level impacts of various levels of enhanced silviculture activities did forest estate modelling (using the TSR1 data packages). The results of these studies serve as the basis for current Resource Management Plans for FRBC's Sustainable Harvest strategic objective.

The Regional Manager of the Cariboo Forest Region also established a joint MOF/industry Options Working Group to investigate opportunities to mitigate the projected AAC falldown (TSR) in the Williams Lake TSA. This group conducted various studies and forest estate-level modelling using the TSR2 data package. It became apparent that similar studies and modelling should be done for the other TSAs in the Cariboo Forest Region and that enhancement opportunities for all TSAs (including the Williams Lake TSA) should be further investigated. To that end, the Timber Enhancement Strategy Committee (TESC) was formed and mandated to conduct this work. Over the next three years (2000 – 2003), the TESC will develop timber enhancement strategies (at the forest estate level).
Specific projects have been identified and prioritised by the TESC steering committee. Individual projects will be delivered by the MYA holders

Status:

Existing ongoing project: RMP-01-39

Objectives:

- Resource Management Plans for FRBC's Sustainable Harvest strategic objective will focus on the strategies developed by TESC. FRBC's Enhanced Forestry, and to some extent resource Inventory investments, will be guided by these strategies.
- Sub-Regional Plans and Landscape Unit-level Plans will determine where on the land base these activities will take place.
- Having clear timber targets will guide the development of sub-regional and landscape level plans. Clear and sustainable timber harvest target levels will assist the development of sub-regional and landscape level plans.
- Uncertainty around the sustainability of current harvest levels and potential for increasing long-term harvest levels may be resolved.

Describe Tasks, Deliverables, Targets and Milestones:
For each TSA in Cariboo Forest Region, TESC will:

- Identify timber enhancement opportunities;
- Develop Timber enhancement strategies;
- Conduct forest estate modelling, using the most current TSR data package as the base case, testing the impact of the proposed strategies on short-, mid- and long-term harvest levels; and
- Refine the strategies to provide the optimum proposed harvest levels.

Individual projects will be identified in multi-year agreement holders work plans. This project will provide the timber enhancement strategies mandated by the CCLUP.
The enhancement strategy will be completed by March 31, 2003.

Cost Sharing:
No cost sharing.

Partnerships:
All MYA holders contribute financially in proportion to their AAC. Agencies contribute Staff time

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
450,000	2	500,000	500,000	0	0	0	1,450,000	4

SSFM Issue # 1	Biodiversity Strategy: Patch Size, Old Targets and Seral Contributions	RMP-02-3

Summary:

Achievement of biodiversity targets of the CCLUP higher level plan is an urgent strategic information gap which the previous three separate projects were designed to address. Biodiversity target achievement requires spatially based planning for spatial and temporal distribution of forest patches. In-house agency work has developed a proposed approach for patch size analysis (spatial distribution of forest patches). This project consolidates, for the Cariboo Region, the proposed approach into an analysis tool for biodiversity target achievement including:

current distribution of forest patches by age/seral and size class

future recruitment into mature seral forest of younger forest age classes, both quantitative and spatial

sensitivity of biodiversity target achievement to critical factors such as: current extent of forest fragmentation (relative extent of previous fire and/or logging history); different terrain types (e.g. plateau vs. mountainous); different Natural Disturbance Types; contribution of, and harvest options for, Mountain Pine Beetle and Problem Forest Type stands

relationships between biodiversity target achievement and timber supply during the current rotation (short term timber availability)

This project addresses these issues for ecosystems and landscape units across the entire Cariboo Region.

Status: Existing

This project consolidates three previous projects into a single project. Previous separate projects - Patch Size, Seral Contribution of MPB/PFT, and Temporal Achievement of Mature/Old Targets - are unchanged. The Patch Size Pilot portion now incorporates in-house agency progress during 2000/01.

Objectives:

Existing information regarding biodiversity target achievement is limited to current seral stage distribution only. Information regarding other CCLUP biodiversity targets, primarily spatial and temporal distribution of cutblocks and other forest patches, is limited to a proposed analysis approach for patch size assessment. This project is required to convert the proposed analysis approach into a planning tool that enables biodiversity targets to be achieved, and in a way that is integrated with timber access and other CCLUP targets, by sub-regional and other strategic planning processes.

This project will also enable short-term harvest opportunities to be identified that optimise the balance between biodiversity and timber access targets.

Describe Tasks, Deliverables, Targets and Milestones:
GIS analysis to produce maps and supporting data to describe:

- current and projected contribution of Mountain Pine Beetle and Problem Forest Type stands to biodiversity seral and patch size targets
- future recruitment of younger forest age classes to meet mature seral forest targets
- sensitivity of seral and patch size biodiversity target achievement to critical biophysical and timber supply factors

A major portion of this project must be competed by end of 2002 to enable Cariboo sub-regional planning processes to adequately address CCLUP biodiversity targets and provide suitable direction for landscape unit planning.

Cost Sharing: NA

Partnerships: NA

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	100,000	25,000	0	0	0	125,000	2

SSFM Issue # 1	Old and Mature Forest Attribute Definition	RMP-02-4

Summary:
The forest attributes that best describe mature and old forests in selected ecosystems in the Cariboo Region need to be defined. This is an issue because forest age (i.e. currently available on forest cover maps) is not an adequate descriptor of true mature and old forests. Targets in the CCLUP have been set for certain amounts of mature and old forest by zones but the definition of these targets has yet to be determined. This is a critical definition that the Biodiversity Committee is currently working on.

This project is regional in scope being completed by Subzone over time.

Status:
This is an existing project

Objectives:
This definition is needed to fully address CCLUP implementation and Land Use Planning. It also has implications for implementation of the Biodiversity Guidebook and potentially TSR (since only required timber will be set aside and no extra.

Describe Tasks, Deliverables, Targets and Milestones:
This year of the project will build upon data and preliminary definitions resulting from work in years one (2000/2001) and two (2002/02). The project will include compilation of data relevant to attribute- and process-based definitions of seral stage in the Interior Douglas-fir biogeoclimatic zone and subzones within the Cariboo Forest Region. Field testing of attribute-based seral stage definitions for the IDF subzones will be conducted. Seral stage definitions will be developed and tested for other forest types and silvicultural systems over the proposed five-year duration of the project.

Cost Sharing: N/A

Partnerships: N/A

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
100,000	2	50,000	50,000	50,000	0	0	250,000	5

SSFM Issue #2 and 3	CCLUP Caribou Strategy – Objectives, targets and monitoring of caribou populations and habitat use.	RMP-02-5

Summary:
Caribou populations within the region are considered regionally, provincially and nationally significant. The entire regional caribou population is considered threatened nationally, while mountain caribou in the eastern portion of the region are red listed provincially. The CCLUP Higher Level Plan specifically provided for special management of several populations within the region (eastern caribou and Itcha-Ilgachuz caribou).

It is critical that adaptive management and operational trials be continued and monitored, to allow for the development of methods of timber harvesting which are compatible with maintaining caribou and caribou habitat values and achieve the balance as described in CCLUP.

There are several components to this project including ongoing population surveys, monitoring habitat use by aerial radio telemetry in the Mt. Tom area and the Charlotte Aplands area, and monitoring habitat use at the stand level in the Satah Mountain Area.

Status: Existing.
Benchmark information on caribou population distribution, size and trend and landscape level habitat use patterns has been collected for the Wells Gray North, Barkerville, Itcha-Ilgachuz and Rainbow Mountains herds. Adaptive management logging trials have been initiated within caribou habitat both in the eastern and western portions of the region.

Objectives:
Require additional population and habitat use information for the Charlotte Alplands Herd and a better understanding of the stand level response by caribou to adaptive management logging trials. Monitoring of population numbers and trend is required.

The overall project will provide a baseline understanding of caribou population and habitat use patterns and then monitor their response to initiated adaptive management trials. This will allow for development of a risk assessment to determine the magnitude of various downward pressures on maintaining viable caribou populations.

Describe Tasks, Deliverables, Targets and Milestones:
Monitor and report on caribou population dynamics and habitat use. This will include:

- Ongoing population surveys of all caribou herds within the region.
- Monitoring of habitat use by radio-collared caribou in relation to adaptive management trials in the vicinity of Mt. Tom within the Quesnel District.
- Monitoring of habitat use by radio-collared caribou within the Charlotte Alplands Herd.
- Monitoring of habitat use, at the stand level, of caribou in relation to adaptive management trials in the Satah Mountain area.

Cost Sharing: NA

Partnerships:
Implemented by MWLAP staff in partnership with MSRM.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
?	?	235,000	140,000	130,000	60,000	60,000	625,000+?	6+

SSFM Issue # 2	Caribou Habitat Mount Tom Adaptive Management trials	RMP-02-5A

Summary

The Mount Tom adaptive management trial represents the third phase (after the pilot and replicated research phases) of our research to develop integrated solutions to managing caribou habitat within a managed forest environment. This phase will apply the silvicultural system at a landscape scale which will allow testing of the caribou response, as well as examining the operational logistics (FERIC will collect cost data) of the system. Approximately 1200 ha will be fully developed over the next few years, while over 2000 ha has been deferred from harvest to serve as a control for the trial. A co-operative agreement with MELP has been established to track the response of radio-telemetry equipped caribou to the development. Harvesting is scheduled to start in phase 1 in the winter of 2000/01. (It was delayed from last winter due to bark beetle salvage.) We were able to obtain base MOF regional funds, and FRBC funds via Weldwood Ltd., to collect pre-treatment lichen abundance and distribution data, and to stratify the block by ecological site series. Site preparation and planting options are currently under discussion.

Approximately 1200 ha will be fully developed with modified harvesting over the next few years while over 2000 ha have been deferred from harvest to serve as a control for the trial. All prescriptions will be based on a 33% volume removal but the size of the removal group varies between 0.1 to 1.0 ha.

The project is located at Mount Tom/Hardscrabble Mountain, near Wells, BC.

Status:

This is an existing ongoing project, RMP 01-12A

Objectives:

Pilot and replicated research trials have been developed jointly by MOF researchers, MELP staff, MOF district staff and licensees, in order to test silvicultural systems that will enable commercial harvesting, yet maintain suitable habitat for caribou in the Cariboo Forest Region. These projects address the concerns for high-elevation caribou populations in the Quesnel Highland east of Likely and the northern caribou population in the Itcha-Ilgatchuz area northwest of Alexis Creek. The replicated research trials include investigation of the effects of harvesting on not only caribou, but also lichen, windthrow, natural and artificial regeneration, and bird populations.

There is sufficient knowledge and understanding gained from the existing research trials to progress into an adaptive management phase of testing these group selection silvicultural systems on a large area.

Describe Tasks, Deliverables, Targets and Milestones:
Knowledge gained from these adaptive management studies will be used in implementation of the CCLUP Caribou strategy and Caribou targets.

In the eastern part of the Cariboo Forest Region, caribou habitat above 1500 m. elevation is deferred from harvesting until an accepted strategy is completed that will address habitat needs. This research will also add to the understanding of natural regeneration, artificial regeneration and snowmelt in the ESSF.

Within the Cariboo Forest Region, northern caribou are considered a key management species. Under the Cariboo-Chilcotin Land Use Plan, about 21% (202,000 ha) of northern caribou habitat will become available for timber extraction using "modified harvesting" practices.

Alternative silvicultural systems are being tested for their effectiveness in reducing the impact of harvesting on caribou habitat, particularly on important lichen forage species. Before the alternative silvicultural systems are recommended, other issues such as tree regeneration, windthrow, wildlife diversity, forest health, and long-term tree productivity must also be investigated. This research project provides the opportunity to study each component relative to the others and will result in an integrated resource management solution.

The knowledge gained from this phase of the project will help to refine the caribou strategy under the CCLUP, particularly pertaining to use of these alternative silvicultural systems on an operational scale.

The project will be monitored periodically in the next 20 years and beyond. This is an adaptive management trial. Results and lessons learned from monitoring will be used immediately to adjust the Caribou strategy, including any future silviculture prescriptions in a process of continual improvement.

Cost Sharing:
No additional funding is available.

Partnerships:
MOF researchers, MELP staff, MOF district staff and licensees have worked co-operatively on this project for several years.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
105,000	3	50,000	50,000	50,000	50,000	50,000	355,000	20

SSFM Issue #3	Caribou Habitat Satah Mountain Adaptive Management Trials	RMP-02-5B

Summary:
The modified harvesting practices tested in the research and adaptive management alternative silvicultural systems trial near Satah Mountain are being implemented operationally by Riverside Forest Products and Tsi Del Del, the major licensees in the northern caribou habitat within the Williams Lake TSA. There are now approximately 2000 ha harvested using the alternative silvicultural systems.

Harvesting was completed in the Satah adaptive management block (600 ha) in March 1998. Harvesting in the second adaptive management block (about 800 ha), located below Baldface Mountain, was completed by March 2000.

The project is located near Satah and Baldface Mountains, northwest of Alexis Creek.

Status:
This is an existing ongoing project, RMP 01-12B

Objectives:
Pilot and replicated research trials have been developed jointly by MOF researchers, MELP staff, MOF district staff and licensees, in order to test silvicultural systems that will enable commercial harvesting, yet maintain suitable habitat for caribou in the Cariboo Forest Region. These projects address the concerns for high-elevation caribou populations in the Quesnel Highland east of Likely and the northern caribou population in the Itchaz-Ilgatchuz area northwest of Alexis Creek. The replicated research trials include investigation of the effects of harvesting on not only caribou, but also lichen, windthrow, natural and artificial regeneration, and bird populations.

There is sufficient knowledge and understanding gained from the existing research trials to progress into an adaptive management phase of testing these group selection silvicultural systems on a large area.

Describe Tasks, Deliverables, Targets and Milestones:

Knowledge gained from these adaptive management studies will be used in implementation of the CCLUP Caribou strategy and Caribou targets.

Alternative silvicultural systems are being tested for their effectiveness in reducing the impact of harvesting on caribou habitat, particularly on important lichen forage species. Before the alternative silvicultural systems are recommended, other issues such as tree regeneration, windthrow, wildlife diversity, forest health, and long-term tree productivity must also be investigated. This research project provides the opportunity to study each component relative to the others and will result in an integrated resource management solution

Within the Cariboo Forest Region, northern caribou are considered a key management species. Under the Cariboo-Chilcotin Land Use Plan, about 21% (202,000 ha) of northern caribou habitat will become available for timber extraction using "modified harvesting" practices.

Alternative silvicultural systems are being tested for their effectiveness in reducing the impact of harvesting on caribou habitat, particularly on important lichen forage species. Before the alternative silvicultural systems are recommended, other issues such as tree regeneration, windthrow, wildlife diversity, forest health, and long-term tree productivity must also be investigated. This research project provides the opportunity to study each component relative to the others and will result in an integrated resource management solution.

The knowledge gained from this phase of the project will help to refine the caribou strategy under the CCLUP, particularly pertaining to use of these alternative silvicultural systems on an operational scale.

The project will be monitored periodically in the next 20 years and beyond. This is an adaptive management trial. Results and lessons learned from monitoring will be used immediately to adjust the Caribou strategy, including any future silviculture prescriptions in a process of continual improvement.

Cost Sharing:
No additional funding is available.

Partnerships:
MOF researchers, MELP staff, MOF district staff and licensees (Riverside and Tsi Del Del) have worked co-operatively on this project for several years.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
662,800	3	26,400	26,400	26,400	26,400	26,400	794,800	20

SSFM Issue #2	CCLUP Caribou Strategy –Monitoring of Wolf Habitat Use and Foraging Strategy	RMP-02-6

Summary:
Wolves will be collared, dominant females will be sterilised using drug injection, and radio-telemetry monitoring will be maintained to track movements. The majority of the area is within Management unit 5-15 with a small section in 5-2.

An understanding of wolf predation levels on caribou and how they might be influenced by timber harvesting and associated road access is required to better understand limiting factors to Mountain Caribou populations located in the East Cariboo.

Status:
Existing, started in 2001/2002.

Objectives:
Caribou populations within the region are considered regionally, provincially and nationally significant. The entire regional caribou population is considered threatened nationally, while mountain caribou in the eastern portion of the region are red listed provincially. The CCLUP Higher Level Plan specifically provided for special management of several populations within the region.

The overall objective of this project is to develop strategies that maintain the caribou population and their habitat, while integrating other values such as timber harvesting, biodiversity, predation levels and winter recreation, as directed by the High Level plan objectives and implementation process.

Describe Tasks, Deliverables, Targets and Milestones:

- Wolves will continue to be captured/collared until a sufficient sample obtained dominant females will be sterilised using drugs
- Wolf movements will be monitored using aerial radio telemetry
- Deliverables include Technical report, and GIS mapping products.
- Required completion date depends on the success of capturing wolves and the natural survival of the wolves being monitored. Two years of monitoring are required after a sufficient sample size of dominant wolves are captured and retained.

Cost Sharing: NA

Partnerships: MWLAP implementing this project in partnership with MSRM.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
82,000	1	120,000	120,000	120,000	70,000	70,000	582,000	6

SSFM Issue # 10	1:20,000 Fish and Fish Habitat Inventory	RMP-02-7

Summary:
Reconnaissance 1:20,000 surveys (RIC) provide information on fish distribution, relative abundance as well as various habitat parameters. The information is suitable for use in landscape and forest development planning. In addition, this inventory methodology has been developed so that data collected from randomly selected field sites within the watershed can be modelled to provide interpretative information for the entire watershed. An intensive inventory program is required in order to address the high portion of Cariboo Region streams that have not been inventoried.
Forest Companies will continue with inventory of key watersheds in the Cariboo Forest region (primarily the Quesnel, Horsefly and Chilcotin Forest Districts).

Status:
Existing, previously known as RMP 49-01

Objectives:
Primarily this information will be used to provide information on watershed-wide fish populations in areas where forest harvesting is underway or planned. Various planning processes will require the information in order to address concerns about both anadromous and non-anadromous fish stocks. It also provides the base for identifying:

- specific fish and fish habitat values requiring enhanced fish protection,
- sensitive fish bearing waters to trigger terrain stability assessments;
- temperature sensitive (bull trout) streams for enhanced riparian protection
- unusual life history timings (for modified in stream work periods)

The interpreted information will be suitable for use in operational planning of forestry activities, including, in many cases, Fish Stream Identification. FRBC no longer funds inventories to classify discrete stream reaches that border proposed roads and cutblocks. Therefore, extrapolated 1:20,000 data will be the primary means of obtaining fish and fish habitat inventory information suitable for operational fish/forestry planning. Reconnaissance 1:20,000 inventory will also allow Forest Companies to dovetail their FPC operational fish inventories with FRBC funded inventories.

Describe Tasks, Deliverables, Targets and Milestones:
- Production of watershed reports for 1:20,000 Fish Inventory and the integration of the information into watershed forest planning; digital information into Provincial databases; roll-up of information into FISS mapping; modelling of fish and fish habitat information for use in Local Area Agreements.
- Field data collection will occur during summer months with final products being delivered by March 31, 2002.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
8,000,000	7	335,000	1,000,000	1,000,000	1,000,000	1,000,000	12,335,000	20

SSFM Issue # 6	Mule Deer Winter Range Stand Structure Mapping and Development of Mule Deer Winter Range Management Plans.	RMP-02-8

Summary:
Mule deer are a regionally important species. They require mature and old stands with good snow interception and forage supply in order to survive the Cariboo winters. These critical stands also have high timber values. Mule Deer Winter Range Management Plans, which will address timber access and sustainable harvest while managing for mule deer habitat, are required for ninety-eight (98) winter ranges across the Cariboo Forest Region. Stand structure mapping is the first step in gathering ecological information required to prepare the management plans. Stand structure mapping has been completed for 30 MDWR's.

Preparation of the MDWR Management Plans (Plans) is the responsibility of the MDWR Working Group. Support is required for creation of the management plans in the form of: helicopter time to conduct flights over MDWR's to apply stand structure mapping results and look at any suspected problems (note: this cannot be tied to the project since the timing of Plan creation and project completion always crosses fiscal deadlines and the money cannot be carried over); GIS support for dozens of iterations of maps required for the Plans (i.e. zone maps, short and long term objective maps etc.); data compilation; sampling of basal area (and other attributes) in the IDFdk3 area south of 100 Mile and transition zones away from the typical IDF wintering areas (this will assist with creation of rules regarding harvesting availability, methods etc.).

The information supplied by the stand structure mapping will directly feed into Management Plan development. Management Plans will provide more certainty regarding mule deer habitat and harvesting on MDWR's as directed in the Integration Report for the CCLUP. This will solve many conflicts and issues as identified in the CCLUP. It should also contribute to the TSR and certification.

If this issue is not resolved then there will always be conflicts and uncertainty about harvesting on the mule deer winter ranges in the Cariboo Region. The scope of this project includes every forest district in the Cariboo Region.

Status: Existing

Objectives:
The biggest challenge is mapping attributes that mule deer require in the winter, using the maps to help develop rules regarding long-term timber access and deer management and writing and the Plans for the MDWR's in the entire region.

There is no current up-to-date mapping for the regional mule deer winter ranges which includes accurate measurable attributes that are important to mule deer (i.e. age class and crown closure does not provide enough information to describe all of the stand attributes that contribute to mule deer winter range). Stand structure mapping has been established to map attributes important to mule deer.

Describe Tasks, Deliverables, Targets and Milestones:
Stand Structure mapping projects involve: air photo interpretation and ground truthing of slope, aspect and stand structure attributes important to mule deer; database creation and GIS mapping. Once the mapping is complete, MDWR Management Planning begins. Preparation of a Plan is a very involved process. The winter range is divided into management zones, preliminary habitat objectives are set, the data is analyzed and compared to the CCLUP Integration report, Mule Deer Strategy and Mule Deer handbook, iterations of maps are produced and the long term objectives and transition strategy evolve.

Must be completed by 2005.

Cost Sharing: NA

Partnerships: NA

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
?	?	180,000	180,000	180,000	0	0	540,000+?	By 2005

SSFM Issue # 12	Inventory of Red and Blue Listed Species and Their Habitats, Rare Plants and Rare Ecosystems.	RMP-02-9

Summary:

- CCLUP implementation requires inventories to identify species and habitats at risk and their management needs. Also, consistent with the CCLUP targets, there is a need to conduct site assessments in order to establish Wildlife Habitat Areas (WHA's) as required to protect these species and habitats.

- This type of inventory can be conducted anywhere within the Region (at the Landscape Unit scale). The highest densities of species and habitats at risk occur in the grasslands making these areas high priority to MWLAP. Conflicts may arise due to competing interests for the grassland habitats (i.e. red & blue spp/habitats vs. range use vs. forest encroachment [burning])

Status:

- Three previous inventories of this nature have been conducted; one in the Taseko Management Zone (MELP) and one in the Moffat area (Weldwood, W.L.) and one region-wide initiative implemented in 2001/2002 on a species-specific basis, i.e. presence/not-detected inventories of 8 selected species with knowledge gaps throughout the region.

Objectives:

- The identification of important habitats required by red and blue listed species is necessary for stand level habitat protection under the Forest Practices Code either as Wildlife Habitat Areas (WHA's) or as part of the Higher Level Plan. Knowledge of the species status and habitat use is required to determine if objectives are being met with the land use management strategies implemented through the CCLUP.

- In order to meet the CCLUP (p. 156 and 158) and FPC requirements, an inventory to identify species and habitats at risk is of high importance. Filling this knowledge gap will help in overall forest and land use planning because it will remove some of the uncertainty in planning development activities in different areas where species at risk issues are a concern.

Describe Tasks, Deliverables, Targets and Milestones:

- Conduct inventories (presence vs. non-presence or relative abundance depending on the species) of wildlife species at risk and Identified wildlife in the Cariboo Region to meet CCLUP and FPC obligations. Multiple species can be inventoried in the same area.
- Conduct detailed site assessments in order to determine WHA requirements for Identified wildlife.
- Monitor species inventoried in previous projects

Deliverables:

- Technical Report(s) following RIC standard format outlining methods, locations of habitat/sightings/signs of use and recommendations
- Maps showing habitat use/suitability/sightings or sign of use.

Target:

- MWLAP staff will use this information to assist in determining WHA requirements for each species and area in which inventory is conducted.

Cost Sharing: NA

Partnerships:

MWLAP implementing this project in partnership with MSRM.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
305,000	2	100,000	200,000	200,000	100,000	--	905,000	6

SSFM Issue # 4	Digital Roll-up Fisheries Inventory	RMP-02-10

Summary:
This project contains two components: Part of the funding is to be used for creation or refinement of digital mapping information collected from 1:20,000 Fish and Fish Habitat Inventory and FPC Stream Classification inventory. Once in suitable format the information will be added to the present GIS database for display and mapping. Information created from this process can be provided to a range of user groups that have GIS capability.

The second, and main, component relates to integration of inventory information into the Fish Habitat Assessment Tool (FHAT20). This interpretative model is a computer extrapolation program used to estimate fish habitat (stream) characteristics, fish presence and capability in non-sampled reaches of watersheds that have received 1:20,000 reconnaissance inventory. Strategic level use for FHAT would increase the confidence in timber supply estimates on a watershed or planning unit basis. A key product provided by FHAT is a set of predictions of channel width and fish presence for all reaches of the project area. These predictions can be used to estimate the most likely Forest Practices Code (FPC) stream class for each reach the level of certainty associated with each prediction. Final products from FHAT could be used to develop Local Area Agreements for watershed-wide stream classifications.

Status: Existing, RMP 22-01

Objectives:
Key watersheds that have had 1:20,000 Fish and Fish Habitat Inventory (FFHI) completed will be prioritised by MSRM and Industry to receive FHAT modelling. The modelling will be undertaken on 1:20,000 FFHI completed in the past few years by contracted biologists familiar with the model program. In addition, funding will be integrated into FFHI presently under way and the maps produced by FHAT will become a final product of the inventory project.

Describe Tasks, Deliverables, Targets and Milestones:
Production of FHAT reports for up to 10 watersheds. The information will be available for integration of the information into watershed planning and for use in Local Area Agreements.
Final products will be delivered by March 31, 2003.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
40,000	2	30,000	50,000	50,000	50,000	50,000	280,000	20

SSFM Issue # 12	CCLUP Moose Strategy	RMP-02-11

Summary:

As a requirement of the CCLUP, wetlands designated as important to moose, especially those utilised during the winter months, need to be identified in areas of high importance to moose in the Cariboo Region. Forested buffers around the wetlands and forest harvesting techniques within or adjacent to buffers will need to be developed. The purpose of the forest buffers adjacent to wetlands is to meet thermal and security cover requirements for moose. Several projects are currently underway to classify wetland types on 1:20,000 map sheets and to develop criteria to determine the importance of different wetland types to moose. These are co-operative working projects between Riverside Forest Products, Yun Ka Whu'ten Holdings and the Ministries of Sustainable Resource Management and Water, Land and Air Protection.

In order to aid in determining adequate buffer width and characteristics on the perimeter of wetlands to meet moose thermal and security cover requirements, additional information on actual moose use of different wetland types and their associated forest buffers is required. The CCLUP suggests a 200-meter buffer on the perimeter of important wetlands may be required on key wetland and riparian habitats. To aid in determining an appropriate buffer width on the perimeter of key wetlands, 10 GPS collars will be placed on moose in the SBPS and SBS zones, east of Williams Lake, in December 2000. Additional GPS collars may be placed on moose in 2001 to increase the sample size. Approximately 4 fixes (locations) per day will be obtained on each animal's location by way of satellites over 2-year period. The data stored in each collar will be used to track moose locations and movements. This level of detail will enable criteria to be developed on moose use patterns in relation to wetlands and to help describe appropriate buffer widths around wetlands and riparian areas. This is a co-operative working project between Weldwood (100 Mile House and Williams Lake Division) and MSRM / MWLAP.

To further complement the wetland classification and GPS collar collection information, ongoing annual moose inventories are recommended, especially in areas where wetland classification has occurred. This component is an important part to the overall program because moose use of various wetlands will vary annually as a result of winter snow depths and temperature. The inventory information will aid in identifying areas of high moose concentrations and their association to wetlands in the area.

The wetland classification and aerial inventory are regional in scope and application. GPS collar data collection will occur in the vicinity of McIntosh Lakes (approximately 60 km's east of Williams Lake).

Status: Existing

Objectives:
The overall project will provide a baseline understanding of moose population and habitat use patterns and aid in development of forest harvesting management practices applicable to moose.

There is limited information on the specific habitat selection patterns of moose in the Cariboo Region, particularly in regard to wetland and riparian habitats. The combination of wetland classification, GPS data collection and inventory will aid in developing forest harvest management strategies for maintaining moose numbers in areas of high wetland occurrence. The inventory data collected in this program will provide information to forest companies for helping to incorporate moose habitat requirements and wetland buffer distances into their forest harvest management plans, where this is appropriate. It will enable appropriate forest harvest management techniques to be developed in critical areas to ensure thermal and security cover requirements are achieved. Over the long term, the co-operative working venture and the development of forest harvest management techniques for moose will ensure long term sustainability of the population and help meet CCLUP requirements for moose.

Describe Tasks, Deliverables, Targets and Milestones:

- Priority #1: Monitor, by way of GPS collars and winter trailing, moose habitat selection and movement patterns in relation to wetlands for 2 years. Based on this inventory work, co-operatively develop appropriate forest harvest management techniques with forest harvesting companies to ensure long term sustainability of moose populations, in appropriate areas.
- Priority #2: Continue updating wetland classification mapping in select areas. Develop criteria to identify wetland and riparian habitats important to moose, especially during the winter period.
- Priority #3: Conduct aerial inventories in select areas to assess population parameters.
- Annual GPS collar data progress reports, annual aerial inventory reports and completed 1:20,000 classified wetland maps. A project completion report will have forest management recommendations in regard to moose and non-forested openings that will be a useful tool for forest management planning.

Cost Sharing: NA

Partnerships:
Implementation of the CCLUP requirements for moose. Co-operative working venture between government and industry.

Investment to date		Investment Required						Total Years to complete
Project	$$/Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
RMP-02-12A: GPS Wetlands	47,500	100,000	0	0	0	0	147,500	2+
RMP-02-12B: MAP Wetlands	50,000	30,000	0	0	0	0	80,000+	2+
RMP-02-12C: Aerial Inventories	?	30,000	0	0	0	0	30,000+	1+

SSFM Issue # 12	Grizzly Bear Population Inventory and Habitat Inventory	RMP-02-12

Summary:
Grizzly bear are an identified wildlife species in the Identified Wildlife Management Strategy and parts of two population units within the region are considered threatened. The CCLUP Higher Level Plan implementation requires research and inventory on grizzly bear habitat and habitat protection needs (p. 161) in order to support resource management and future integrated resource management decisions. Population and habitat inventories are required to determine whether population unit objectives are being met with the land use management strategies implemented through the CCLUP.

Benchmark information on grizzly bear population distribution, size and trend and habitat use patterns is completely lacking for the Cariboo Region. Existing knowledge of habitat capability and suitability is limited to small-scale mapping, which is not suitable for operational planning purposes. Filling this knowledge gap will help in overall forest and land use planning because it will remove some of the uncertainty in planning forest development activities in important grizzly bear areas.

Inventories of grizzly bear populations will be conducted in the interior Cariboo population to establish knowledge of current population size and relative abundance, and to determine areas of critical grizzly bear habitat, with the priority for inventory based on the current population status (i.e. threatened populations have higher priority).

Cariboo Region priority areas are (1) South Chilcotin, (2) Blackwater – West Chilcotin and (3) Quesnel Lake – Quesnel Highland.

Status:
Existing. Project: $50,000 committed for grizzly bear population inventory 2001/2002. Project design and workplan completed to begin DNA inventory methods in spring 2002.

Objectives:

- To assess the status of grizzly bear populations and to determine where grizzly bear habitat protection needs to be considered.

- The identification of important habitat is necessary for stand level habitat protection under the Forest Practices Code either as Wildlife Habitat Areas (WHA's) or as part of the Higher Level Plan. Knowledge of the population status is required to determine whether population unit objectives are being met with the land use management strategies implemented through the CCLUP.

- It is critical that grizzly bear habitat and populations are sustained during timber harvest development of forestlands. It will be important to be able to document stable or recovered status of grizzly bear populations in order to achieve forest company certification in some parts of the region.

- Improved knowledge from population and habitat inventory may allow for implementation of specialised silvicultural prescriptions or forest planning that addresses maintenance of grizzly bear values within important grizzly bear watersheds.

Describe Tasks, Deliverables, Targets and Milestones:

- Conduct DNA based mark and re-capture inventory at the relative abundance level.

- Deliverables will include a technical report as per RIC standards. DNA results of each grizzly bear identified within the study area. Workplan to continue project the following year.

Cost Sharing: NA

Partnerships: Will be implemented in partnership with MWLAP staff.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
50,000	1	200,000	200,000	200,000	75,000	75,000	800,000	6

SSFM Issue # 2	Adaptive Management Trial of the Mountain Caribou Strategy	RMP-02-13

Summary:
This project is linked to:

- Mt Tom Adaptive Management Trials
- CCLUP Caribou Strategy Monitoring Mt Tom
- Short Term Timber Access Study
- SP Pilot for Modified Harvest Areas
- CCLUP Caribou Strategy: Monitoring Population
- Caribou, Moose, Wolf Population Dynamics Study
- Caribou population Dynamics (Juvenile Survival Rates)

The CCLUP Mountain Caribou Strategy recommended maintaining habitat in managed ICH Forests. The project involves adaptive management on several cutblocks in the modified zonation with a control adjacent but outside the modified zone. These trial areas will aid in transition of recommendation sin the Strategy by identifying and resolving operational issues.

The project will have direct application to other ICH stands designated as Low Elevation Habitat and to other areas of the province with Caribou habitat in this ecosystem. The project will be harvested using group selection harvesting as prescribed in the modified harvest recommendations, with an adjacent area acting as the control.

Status:
New project, which is a take-off from the Mt Tom trial to the north in the Quesnel TSA. This trial is targeting Low Elevation Habitat in the ICH ecosystem, in leading cedar/hemlock stands.

Objectives:

- The summer of 2002 will involve the collection of pre-treatment data to be followed by harvest in the fall/winter of 2002-03
- Specific interests are seedling response, windthrow hazard, fire hazard, harvesting/ road construction/silviculture costs and lichen retention.

Describe Tasks, Deliverables, Targets and Milestones:

- pre-trial plot establishment
- monitoring harvest and post harvest activities, collection of costs and productivity data
- monitoring silviculture and post harvest activities and establishment of seedling response trials, lichen biomass and control measurements
- publication and review of annual results
- review of trial data and recommendations to modified harvest systems and Caribou Low Elevation Habitat Strategy
- project monitoring until 2007

Cost Sharing: none

Partnerships: Caribou Forest Region, Ministry of Forests Research section, West Fraser Mills, Ministry of Forests Horsefly District

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$40,000	$40,000	$40,000	$40,000	$40,000	200,000	5

SSFM Issue # 8	Prognosis Model Development	RMP-02-14

Summary:
Used for TSR purposes to calculate the allowable annual cut in uneven age stand types and operational cut levels. This program supports the policy and guideline issues for the uneven age cutting and relates to Issue # 8 in the Timber Supply Review.
The project needs to establish plots in:

- SBSdw1/dw2
- SBPSmk/xc

Status: Existing.

Objectives:
Establish 50 plots in both of the SBSdw1/dw2 and the SBPSmk1/xc. State objectives in relation to the activity role in the overall knowledge strategy.

Describe Tasks, Deliverables, Targets and Milestones:

- Field establishment of 100 plots in the two BEC sub zones in 2002. The working model to be calibrated by the following January and any additional data requirements to be identified and a sampling program designed for the following year. Field work to be completed during the summer of 2002.
- Plots to be established during the summer of 2002.
- Model calibrated by January 2003
- Additional data requirements to be identified in January and a sampling program designed by February IF REQUIRED.

Cost Sharing:
None.

Partnerships:
FRBC.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
200,000	1999/ 2000	167,000	150,000	150,000	0	0	667,000	4

SSFM Issue #1a	Evaluate Natural Disturbance Type (NDT) Patterns	RMP-02-15

Summary:

- This project is linked to SSFM Issue "Biodiversity/Landscape Level/Patch/Even-aged".
- A basic tenet of the Forestry Plan is to design forest practices that create patterns and structures within the range of those created by natural disturbances.
- To pattern management within the variability of natural disturbances requires that something is known about the extent, frequency, and severity of natural disturbance. The Biodiversity Guidebook provides first approximations of fire return intervals in the Natural Disturbance types (NDTs) in the province. Most ecologists (and certifiers) agree that these estimates should be refined to give more accurate local direction.
- This methodology and resultant data will be applicable throughout the Cariboo Forest Region.
- While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #5.5

Objectives:

- To obtain information on natural disturbance patterns through completion of a literature review
- To outline the range of vegetation types and patterns that reflect historic variability.
- To define a set of those types and patterns that are socially acceptable in today's management context.
- To test the concept of establishing a baseline of natural disturbance patterns.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:

April 2000 to March 2002.

- Select Researchers and review NDT4 workshop proceedings and consult with Regional Ecologists
- Select researchers and undertake Literature Review *Completed.*
- If literature review indicates more work would be useful then: *Completed.*
- Collect baseline photography and complete comparisons *Completed.*
- Design encroachment and fire pattern field work *Completed.*
- Complete field work, dendrochronology and charcoal analysis Underway.

Cost Sharing: No

Partnerships: No

Investment to Date		Investment Required						Total Years to Complete
$$	Years	$$ 2002/03	$$ 2003/2004	$$ 2004/2005	$$ 2005/2006	$$ 2006/2007	$$ Total	
200,000.	1	50,000	0	0	0	0	250,000	2

SSFM Issue #: 1b	Stand Structure and Seral Stage Definitions	RMP-02-16

Summary:

This project is linked to SSFM Issue "Biodiversity/Stand Level/Attributes".
The need for structure-based rather than age-based definitions in multi-layered stand types has been well documented. Defining attribute-based stand definitions will enable forest planners and silviculturalists to determine where attributes currently occur and to identify stand treatments necessary to achieve desired future objectives. Stand structure of forests is characterised by many attributes. Basal area is not the only attribute that characterises old forests. However, many important attributes are not identified in the current forest inventory. Stand attributes such as "old growthness" indices or seral stage thresholds must be defined in quantifiable ways using recognised mensurational parameters. These identifiable attributes must be considered during inventory activities to ensure commonality between data collected within various programs such as TEM, VRI and Growth and Yield.

Resulting definitions will be applicable throughout the Cariboo Forest Region.
While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #5.6

Objectives:

- To develop stand structure and seral stage definitions for multi-layered Douglas-fir stands which are useful for operational landscape and stand level planning, and wildlife habitat management planning.
- To co-ordinate the structural stage attribute definitions with Regional Biodiversity Committee.
- To reduce the landbase constraints associated with age determined seral stage thresholds in multi-layered Douglas-fir stands.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:

- Establish working group. *Completed.*
- Review current Regional and NDT 4 working group progress. *Completed.*
- Identify terms of reference and areas needing further development *Completed.*
- Design detailed workplan for sampling and operationalization of attribute based definitions currently proposed by Regional ecologists *Completed.*
- Confirm MoF interaction *Completed.*
- Source data and background work initiated to date through TAC and related programs *Completed.*
- Define stand structure attributes. *Completed.*
- Define stand structure stages. *Underway.*
- Determine correlation between stand structure attributes. *Underway.*
- Determine how to quantify habitat using recognised mensurational parameters.
- Utilise database and sample plan from the project developing Fir Yield curves for identified stand structure types.
- Final Design
- Implement sampling to collect stand structure attributes in the main types of NDT4.
- Analysis
- Explore current models to determine which best deal with projecting structure (e.g., VDYP).
- On-going Refinement/Interaction
- Incorporate results into FP Modelling
- Timber Supply Branch Consultation for Douglas-fir yield curves
- Incorporate Region/Branch Comments
- Interim Report
- Regional approval
- Final Report
- SRP Incorporation

Cost Sharing: NA

Partnerships:
Close working relationships with the Regional Biodiversity Committee involve data sharing and exchange of analysis results.

Investment to Date		Investment Required						Total Years to Complete
$$	Years 2001-02	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
220,000	?	150,000	20,000	$	$	$	390,000	?

SSFM Issue # 9	Managed Stand Growth and Yield (MSGY) Program	RMP-02-17

Summary:
This project is linked to SSFM Issue "Timber/Enh/Growth and Yield (inc)/TESC".

Establishing localised data on managed stand responses to various treatments is an integral part of the Forestry Plan. This data is required as input into the timber supply review, habitat production analyses, and silviculture treatment regimes. The ability to accurately predict and model growth requires localised accurate yield curves. Completing the Managed Stand Growth and Yield program & conducting re-measurements will provide Lignum with more suitable data on which to base future Timber Supply Reviews. This project is linked to Douglas-fir yield curve, Pl Site Index, taper equations and OAF revisions. This resulting information will be incorporated into timber supply analyses and will be expected to support an AAC uplift. Initially, short-term benefits such as calibrating stand and individual tree models are available from Permanent sample plots (PSP). Analysis of data from these PSPs will continue over the term of the Forestry Plan. This activity is applicable to landscapes throughout the Cariboo Forest Region.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity # 4.8

Objectives:

- Determine the change in (response of) tree, stand and habitat development patterns relative to different harvesting and silvicultural treatments.
- Provide a mix of short term and long term results based on establishment of Permanent Sample Plots (PSPs).
- Provide data that will augment current inventory information and projections.
- Develop treatment response data to support long term silvicultural regimes.
- Develop linkages and support for ecosystem management.
- Demonstrate potential for increased volume growth from IFPA area stands through provision of data on managed stand growth trends.
- Evaluate and design a MSGY program that is cost effective and sustainable.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
The project was started in April 2000. Plot establishment is expected to be completed by March 2003. Project analysis and re-measurement will be ongoing through December 2004.

Managed Stand Growth and Yield Program.

- Hold Workshop. April 2000.
- Steering Committee Recommendations May 2000.
- Assess and Incorporate Recommendations June 2000.
- Interim Program Design Sept. 2000.
- Peer Review
- Final Program Design
- Review of establishment procedures/Prepare field manual.
- Establishment of Managed Stand PSPs.
- Establish Treatment Plots
- Conduct Treatments
- Conduct first re-measurement of PSPs.
- Conduct interim Analysis of Managed PSP data.
- Incorporate interim data into G&Y Models
- Review with Region/Branch
- Conduct Analysis of Managed PSP data.
- Timber Supply Branch Consultation

Cost Sharing:
Lignum is currently seeking funding from outside of Lignum IFPA funding and the Cariboo RMP.

Partnerships:
Current partnerships with the MOF Inventory Branch, Research Branch and the Cariboo Forest Region.

Investment to Date		Investment Required						Total Years to Complete
$$	Yrs	$$ 2002-03	$$ 2003-04	$$ 2004-05	$$ 2005-06	$$	$$ Total	
$600,000	2	$100,000	$100,000	$100,000	$100,000	$	$400,000	4

SSFM Issue # 1a	Forest Health Remote Sensing Research	RMP-02-18

Summary:

This project is linked to SSFM Issue "Biodiversity/Landscape Level/Risk Management/Mountain Pine Beetle".

As part of the innovation proposed in the Forestry Plan, Lignum will examine research opportunities to develop remote sensing technologies designed to provide cost effective early identification of insect damaged and windthrow trees. Early and detailed identification of occurrences of damage may enable Lignum to minimise the level of non-recoverable losses from forest health factors.

Methodology is applicable throughout the Cariboo Forest Region.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #9.3

Objectives:

- To promote the use of remote sensing as a tool to assist identification of insect damaged and windthrow trees.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
Start project in September 2001; Interim reporting November 2002. Annual assessment of stands throughout the term of the IFPA.

- Review remote sensing technology for application to identification of insect damage.
- Prepare RFP with MoF input to solicit specific application trial proposals.
- MoF Interaction.
- Conduct trials using selected methodology.
- Report on success of trials.
- Establish and test operational system.
- Incorporate data into IFMS, MPB strategy and harvest system.
- Incorporate data into Timber Supply Analysis package.

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years 2001/02	$$ 2002-03	$$ 2003-04	$$ 2004-05	$$	$$	$$ Total	
$30,000	1	$25,000	$0	$0	$	$	$55,000	1

SSFM Issue # 8	Net Volume Adjustment Factor – WLTSA	RMP-02-19

Summary:
Tree volume for the Vegetation Resources Inventory (VRI) is estimated by using the taper equation for gross volume, a net factoring deduction for net volume and a net volume adjustment derived from NVAF sampling.
Current Timber Supply Analysis depends on provincial loss factors and taper models. A report of the results of the Williams Lake Timber Supply Area sampling, conducted in 1999, pointed out that further work might support what appears to be species-specific trends for this unit. For instance, pine taper appears to be underestimating gross volume and pine loss factors appear to be overestimating decay and waste.
There is the potential to increase the available volume as a result of this work, in the TSA process.

Status:
In 1999, three licensees (Riverside, West Fraser and Weldwood) undertook an overall NVAF study in the Williams Lake TSA, following the MOF protocol of deriving an overall, non-species based result. Utilising the current Timber Supply Analysis units for the Williams Lake TSA, the option of identifying more samples using either leading species or BEC zones will be investigated through this project. Based on the 'statistical minimum' of 30 samples per strata, a sample list for the fieldwork will be developed. NVAF sampling requirements can be completed at the same time that destructive sampling occurs on a plot.

Objectives:
To confirm or modify volume net downs for decay based on a program of field sampling and subsequent analysis.

Describe Tasks, Deliverables, Targets and Milestones:
A sample list will be produced by Resources Inventory Branch, with Regional government and licensee input. Fieldwork – data from selected trees – will be conducted by qualified contractors. Branch and Regional specialists will check that the work is carried out to standard. Analysis will occur during the fall and winter of the year, and will be part of the data for Timber Supply 3.
Associated project preparation, field work (including Quality Control and Assurance), and analysis should occur within a one year period.

Cost Sharing:
The Ministry of Sustainable Resource Management's Vegetation Resource Inventory Forester will be made available to maintain a Project Management role, and provide Quality Assurance assistance. This can maximise funding available to field crews to conduct the destructive sampling.

Partnerships: N/A

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
?	1999	75,000	0	0	0	0	75,000+?	5

SSFM Issue # 12	Cariboo-Chilcotin Furbearer Inventory	RMP-02-20

Summary:
The CCLUP directs that habitats will be managed for furbearers. Due to the lack of information, minimal input has gone into the protection of furbearer habitat in the forest development planning process. There is no preliminary information available on furbearer presence or absence prior to logging, or their habitat requirements. The risk of lack of knowledge in this area is a loss of furbearer numbers or species in the area, in addition to the inability to meet CCLUP requirements.

In the winter of 1998/99 a pilot project was established in the Anahim Lake area. Winter snow tracking of furbearers in different Biogeoclimatic zones (at pre-established transect sites) was carried out in 1999/2000, 2000/2001, and 2001/2002. Habitat classification was begun in 2000/2001 and will be continued in 2001/02 and 2002/03. This is a five-year project with three years complete so far. Year four would see the continuation of the furbearer snow tracking and habitat classification methodologies at the same locations previously established in the Anahim Lake area. Information describing presence and absence, as well as habitat preferences and requirements for each species will be used to develop stand and landscape level habitat management measures for furbearer species.

Status: Existing

Objectives:
The objective of this five-year project is to implement better methods of sustainable forest harvesting to protect this group of species and meet CCLUP requirements by obtaining knowledge on furbearer presence/absence and their use of different habitats. This knowledge will enable stand and landscape measures for the maintenance of furbearer habitat requirements to be incorporated into forest harvesting plans.

Describe Tasks, Deliverables, Targets and Milestones:
Continue a long-term (5 years) snow tracking and habitat classification survey program in various biogeoclimatic zones found in the Cariboo Region. Collect information to obtain presence/absence information as well as habitat requirements data. Snow tracking techniques are also available to assess the impact of forest harvesting on furbearers before it occurs.

Cost Sharing:

Partnerships: Previously carried out in partnership with Yun Ka Whu'ten/ MSRM/ MWLAP.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
245,000	3	90,000	100,000	0	0	0	435,000	5

SSFM Issue # 1b	Uniform Shelterwood Systems for Even-Aged Douglas-fir/Lodgepole Pine Stands in the SBSdw1 Subzone	RMP-02-21

Summary:
This uniform Shelterwood trial was established in 1990 primarily to obtain Douglas-fir regeneration. Establishment and growth of natural regeneration depends on quantity and quality of seed, appropriate seedbed, adequate moisture and light, predation rates of seed, and vegetation competition. This research project has looked at each of these aspects over the years.

The main goal for the project this year was to publish the natural regeneration, seed fall, seed predation, micro-climate and seedbed data in a MOF Working Paper. This has been done. An Extension Note that summarises all results up to 1998 was finalised for publication in April and has been posted on the Ministry of Forests Research website. The project entered the next active phase in 2000/2001. The second cut (regeneration cut) in the 70% residual basal area (RBA) treatments and buffers started January 2001. The goal was to reduce the RBA from 70% to 35% (20m²) in order to stimulate the establishment and growth of natural regeneration while retaining frost protection. Pre-treatment data on vegetation and natural and planted regeneration was be collected by students in the summer of 2000.

There are three replicate study sites: Beedy Creek in the Williams Lake Forest District, and the Gavin Lake Road and UBC Research Forest sites in the Horsefly Forest District. All three sites are situated in the SBSdw biogeoclimatic subzone, in mature (80-120 year old) Douglas-fir and lodgepole pine mixed stands. The approximate size of each study area is 15 to 30 ha. This size is required to accommodate the five 1.4-ha treatment blocks and treated buffers.

Status: Existing project

Objectives:

- Between 1980 and 1990, it became obvious that plantation success in Douglas-fir was difficult to achieve in the SBSdw1 and SBSdw2 subzones. These subzones are characterised by dry, warm conditions, with frequent growing-season frost in a variety of locations across the landscape. The hot and dry conditions, coupled with frequent radiation frosts (and possibly combined with stock problems), made artificial regeneration of Douglas-fir very difficult. It seems that given appropriate conditions, natural regeneration will occur under the shelter of a residual canopy of trees.
- The SBSdw subzones in the Cariboo Region are found in the Williams Lake, 100 Mile House, Quesnel and Horsefly Forest Districts, and contribute a significant proportion of the AAC for the region. Maintenance of Douglas-fir leading stands across the landscape will be important for certification, as well as TSR.
- The sites are productive in terms of timber and range resources, as well as having high value in recreation, wildlife, water supply and aesthetics. The use of all of these resources places a heavy demand on the land base.
- Regeneration of stands to Douglas-fir will maintain biodiversity, mitigate pest problems and maintain a component of Douglas-fir in the long-term timber supply.
- Regeneration of stands to Douglas-fir will maintain biodiversity, mitigate pest problems and maintain a component of Douglas-fir in the long-term timber supply.

The following are overall benefits that would result from adoption of the Uniform Shelterwood study in the SBS.

- Successful regeneration of Douglas-fir.
- Maintenance of Douglas-fir leading stands across the landscape to maintain biodiversity and to mitigate pest problems.
- Maintenance of a component of Douglas-fir in the long-term timber supply.
- Enable proactive management by beetle proofing and lessening windthrow.
- Capture more volume from the stands by harvesting early mortality and increase the value of the residual stand by increasing piece size.
- Access timber earlier than the rotational age (120 years) through prepatory cut (commercial thin) and possibly the seed cut.
- Increased access to timber because green-up rules will not apply.

Describe Tasks, Deliverables, Targets and Milestones:

- Results so far indicate that regeneration of Douglas-fir is successful. There are still a few biological questions and management issues that need to be resolved and these will be the focus of the next phase of the trial. This project needs to be further developed through adaptive management to a larger operational scale.
- This research will also add to our understanding of Douglas-fir natural regeneration dynamics and to the environmental conditions required for re-establishing Douglas-fir on these sites after harvesting.
- Project monitoring until 2015.

Cost Sharing:

No additional funding is available.

Partnerships:
Weldwood, UBC, and MOF Research section and Horsefly Forest Districts have been working co-operatively on this project since inception

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
151,000	3	14,000	40,000	40,000	40,000	40,000	35,000	15

SSFM Issue # 8	Growth and Yield Permanent Sample Plot (PSP) Re-Measurements in the Cariboo Forest Region	RMP-02-22

Summary:
Growth and yield samples in natural stands have been established throughout the province since the early 1970's. Re-measurements are scheduled on a ten-year basis. The re-measurement data are used to calibrate the variable density yield program (VDYP) model. In order to ensure the retention of the investment in establishments, re-measurements must be carried out as scheduled. As the frequency of re-measurement increases, the value of the investment in PSPs also increases
overview of geographic area covered)

	Number of Permanent Sample Plots by District					
Fiscal Year	Quesnel	Williams Lake	Horsefly	100 Mile House	Chilcotin	Total
2002/03	3	28	15	29	14	89
2003/04	10	10	10	10	10	50
2004/05	10	3	16	20	4	53

Status:
This an existing on going project, RMP-01-42

Objectives:
In order to ensure the retention of the investment in establishments, re-measurements must be carried out as scheduled

Describe Tasks, Deliverables, Targets and Milestones:
Re-measurement of natural stand Growth and Yield permanent sample plots located throughout the Cariboo Forest region.
There are samples to be re-measured every year on 10-year re-measurement cycle.

Cost Sharing:
No cost Sharing

Partnerships:
No partnerships.

Investment to date		**Investment Required**						**Total Years to complete**
$$	**Years**	**$$ 2002/03**	**$$ 2003/04**	**$$ 2004/05**	**$$ 2005/06**	**$$ 2006/07**	**$$ Total**	
295,000	**2**	**120,000**	**75,000**	**80,000**			**570,000**	**indefinite**

SSFM Issue #: 12	Activity: Mountain Goat Animal Inventory	Activity #: RMP 02-23A

Summary:

Mountain goats are considered to be both regionally and provincially significant species and are included in the Identified Wildlife Management Strategy (IWMS). Although some population inventories have been conducted in recent years there are still considerable knowledge gaps for some areas and populations. Population and habitat inventories are needed to aid in subregional and landscape planning levels. Critical areas of importance are identifying natal areas, winter ranges, mineral licks, as well as population monitoring. Geographic area would involve the Chilcotin ranges and Quesnel highlands.

The new knowledge would be used to mitigate industrial and recreational activities near or within sensitive areas such as natal areas and winter ranges. Mountain goats are sensitive to disturbance and both recreational and industrial activities can have an impact on the use of key seasonal habitats. Mitigating the impacts of forest development on a provincially significant species such as mountain goat would be a positive step in demonstrating that forest development can occur in an environmentally sustainable manner.

Region wide however some priority areas are; (1) the mountain ranges south of Quesnel lake, (2) Charlotte Aplands Horsefly river drainages, (3)the mountain ranges between the Homathko river and Klinnaklinni river.

Status: Existing

Objectives:

Inventory information is required to identify critical habitats for planning purposes and potential WHA status. In addition silvicultural practices such as domestic sheep grazing for vegetation control purposes pose a serious threat in the form of disease transmission. It is important that critical mountain goat habitats be identified and mapped so that adequate buffers can be established between goat ranges and areas used for domestic sheep grazing.

Describe Tasks, Deliverables, Targets and Milestones:

- Continue some periodic population monitoring to ensure that mitigative measures are adequate to sustain herd health and that populations are being maintained at adequate levels.
- Conduct baseline animal inventory for those mountain blocks where no inventory is available or the existing inventory is so outdated that it is considered suspect.

Cost Sharing:

Partnerships: Must be implemented in conjunction with MWLAP staff.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
50,000	1	30,000	10,000	10,000			100,000	4

SSFM Issue #: 12	Activity: Mountain Goat Habitat Inventory	Activity #: RMP 02-23B

Summary:
Mountain goats are considered to be both regionally and provincially significant species and are included in the Identified Wildlife Management Strategy (IWMS). Habitat inventories are needed to aid in subregional and landscape planning levels. Critical areas of importance are identifying natal areas, winter ranges, mineral licks, as well as population monitoring. Geographic area would involve the Chilcotin ranges and Quesnel highlands. Some priority areas are: (1) the mountain ranges south of Quesnel lake, (2) Charlotte Alplands / Horsefly river drainages, (3)the mountain ranges between the Homathko river and Klinnaklinni river.

The new knowledge would be used to mitigate industrial and recreational activities near or within sensitive areas such as natal areas and winter ranges. Mountain goats are sensitive to disturbance and both recreational and industrial activities can have an impact on the use of key seasonal habitats.

Mitigating the impacts of forest development a provincially significant species such as mountain goat would be a positive step in demonstrating that forest development can occur in an environmentally sustainable manner.

Status: Existing

Objectives:
The inventory information would be used to identify critical habitats for planning purposes and potential WHA status. Locations of key natal sites and winter ranges would be valuable for sub-regional planning purposes to establish timing windows to mitigate concerns regarding industrial and tourism operations near these critical areas. In the case of natal areas this would aid in the establishment of WHA's for these critical sites.

In addition silvicultural practices such as domestic sheep grazing for vegetation control purposes pose a serious threat in the form of disease transmission. It is important that critical mountain goat habitats be identified and mapped so that adequate buffers can be established between goat ranges and areas used for domestic sheep grazing.

Describe Tasks, Deliverables, Targets and Milestones:
- Map and classify winter and spring habitat to identify critical winter ranges and natal areas.
- Produce a technical report and map layer of identified critical habitat areas.

Cost Sharing:

Partnerships: Must be implemented in conjunction with MWLAP staff.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
60,000		30,000	30,000	30,000				

SSFM Issue # 8	Inventory Strategy- All Resources	RMP-02-24

Summary:
Objectives of CCLUP, TESC and other initiatives will not be fully realized without access to viable resource inventory data. Current resource inventory programs could improve efficiencies and lower costs by conforming to a unified strategic plan. Knowledge is lacking on the impact of current inventories to forest and resource management.
The strategy would cover the entire Cariboo Region.

Status: New

Objectives:
Determine what we want to do, why we want to do it, and how we intend to efficiently do it from a resource inventory perspective.

Describe Tasks, Deliverables, Targets and Milestones:
Complete a strategic plan for all resource inventories in the Cariboo Region by March 2003.

Cost Sharing: None.

Partnership:
FRBC.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	40,000	0	0	0	0	40,000	1

SSFM Issue # 10	Winter Limnologies	RMP-02-25

Summary:
Winter limnologies will be carried out on 75 - 100 lakes in the Cariboo Region to determine the capability of selected waterbodies to support fish through the period of winter ice-over. Winter oxygen levels have been identified as the key factor for determining a lake's capability for sustaining fish over a long term.
Crews will access selected lakes by helicopter, drill sample holes in the ice and obtain oxygen and temperature profiles. Data will be recorded on standards forms and information will be key punched in to the regional databases.

Status: Not funded in 2001/02 (continuing from 2000/01)

Objectives:
The work will be carried out by MSRM and WLAP staff during the period of lowest oxygen concentrations (early to mid March). Access to remote lakes will be by helicopter. Information will be collected, analyzed and integrated into the Cariboo Region Winter O2 Database. Interpreted information form the database will be provided to Lakes Classification Committees and used for planning future 1:20,000 lake inventory. RIC standards will be adhered to throughout the project.

Describe Tasks, Deliverables, Targets and Milestones:
Oxygen profiles will be obtained for approximately 75 lakes in the Cariboo Forest Region during March 2003. Data collected during the survey will be entered into regional databases by March 31, 2003.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM, MOF

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
80,000	6	10,000	0	10,000	0	10,000	110,000	11

SSFM Issue # 8	Pine Bark Beetle Infestation Monitoring	RMP-02-26

Summary:

- Establishment of a random sample across the areas of likely MPB infestation will allow an annual quantitative assessment (vol/ha, total volumes etc.) of the expansion in green, red and grey attack as well as the associated harvest.
- Sample design, and establishment; annual reassessments of attack and harvest levels. Annual compilations.
- BEC Subzones within the Quesnel District.

Status: New

Objectives:

To establish a random sample of approximately 200 plot clusters in the BEC Subzones currently experiencing high infestation rates from Mountain Pine Beetle. To cruise these plots initially then record the levels of green, red and grey attack as well as harvesting, that take place annually on these plot clusters through the duration of the infestation.

Describe Tasks, Deliverables, Targets and Milestones:

- Field establishment of 100 cruise plot clusters (5 measure plots per cluster).in each of 2002 - 2003 and 2003 - 2004.in the relevant BEC Subzones.
- Clusters can be established and cruised during the summer months (June to September) with the first and subsequent assessments of infestation levels from mid October to the end of November.
- Standard cruise compilation prepared annually in December or January of each year following assessment of attack levels and harvesting on the plot clusters.

Cost Sharing: NA

Partnerships: FRBC

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	100,000	100,000	60,000	60,000	60,000	380,000	5

SSFM Issue # 10	Bull Trout Intensive Inventory	RMP-02-27

Summary:
Intensive level inventories are required to address priorities of the CCLUP, Identified Wildlife Management Strategy, Species at Risk objectives and the Regional Fisheries Branch. These will be primarily carried out by MSRM or WLAP but Forest Companies are encouraged to carry out intensive studies to ensure that concerns about species specific fish populations are addressed.
Bull trout are sensitive to changes in their habitat, especially as it relates to increases in stream temperatures. In order to better understand the life history and habitat requirements of bull trout in the Cariboo region, studies will be carried out on several watersheds (Cariboo River, Cotton wood River, Blackwater River).

Status: New

Objectives:
Studies will be undertaken using RIC standards and will include spawner timings, rearing areas, size and age, etc. A radio-tagging program will be set up on one of the watersheds to record specific movements of adults during the spawning season. A weir will be installed on a Cariboo River tributary to assess adult bull trout movement as well as to obtain specific stock characteristics. Habitat parameters will be identified and stream temperatures will be collected.

Describe Tasks, Deliverables, Targets and Milestones:
Results from the bull trout study will be analysed and compiled into a report by March 31, 2003.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	100,000	150,000	150,000	0	0	450,000	3

SSFM Issue # 4	Resource Information Management Framework	RMP-02-28

Summary:

- Using the Horsefly Forest District as a geographic subset of the Cariboo Forest Region,
- Standardise all available resource information that is digitally available
- Develop the data links to facilitate data sharing
- Provide easier access for analytical use and communication

Status: New project

Objectives:

- Integrate data that would enhance CCLUP implementation, TSR and certification initiatives through standardisation and common input-output formats.
- increase flexibility to rapidly and efficiently meet changing access constraints so that integrity of data remains high and decision making timely

Describe Tasks, Deliverables, Targets and Milestones:

- choose appropriate platforms, scales and data fields to fit majority of needs
- combine existing digital information at appropriate scales and detail
- provide information to all interested parties in a standardised format
- data library and conversion into standardised formats

Cost Sharing: none

Partnerships: none.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	35,000	0	0	0	0	35,000	1

SSFM Issue # 13	Development of a Predictive Model for Stream Shade	RMP-02-29

Summary:

The purpose of this project is to inventory stream shade across a sample of streams with different topographic and vegetation features. This will be used to develop a predictive relation between surrogate variables and stream shade and, in conjunction with other projects, to test stream temperature models and riparian management scenarios.
Tasks: Select base maps and aerial photos. Select a stratified random sample of homogeneous stream reaches stratified by major independent variables such as clearcut < 5 years old, clearcut 10-15 years old, streams < 3 m wide, and streams > 3 m wide. Sample stream reaches for shade as ACD and other physical variables. Develop empirical model for predicting ACD.

The geographical scope is the Horsefly watershed, upstream from the town of Horsefly

Status:

This is an existing ongoing project

Objectives:

The objectives are to:

- Sample stream shade on stream reaches in the Horsefly watershed.
- Collect other measurements which are expected to control stream shade such as channel width, topography, BGC zone and seral stage.
- Develop a predictive relationship for stream shade from surrogate variables.

Describe Tasks, Deliverables, Targets and Milestones:

- Using procedures developed by the Cariboo Region research hydrologist, this program provides actual stream shade data for a sample of stream reaches and a stream shade predictive model.
- Field work mainly in August and September to coincide with higher stream temperatures. Preparation and analysis throughout the year. The proposed duration of the project is four years.

Cost Sharing: NA

Partnerships: **NA**

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
19,000	1	19,000	19,000	19,000	0	0	76,000	4

SSFM Issue # 6	Silvicultural Systems for Douglas-fir Stands on Very Deep Snowfall Mule Deer Winter Ranges in the Cariboo Forest Region	RMP-02-30

Summary:
This is a pilot project to explore various opening sizes that could be used in conjunction with group selection, patch cut or clearcutting silvicultural systems on very deep snow pack MDWR. The main objectives are to ensure regeneration success and maintain mule deer use.

A study site, situated on MDWR, has been selected and pre-harvest data collection began in 1996. Twenty percent of the 90 ha block was harvested in openings, roads and landings in the fall of 1997. Four opening sizes were harvested: 0.25 ha (15m x 180m), 0.50 ha (30m x 180m), 1 ha (60m x 160m) and 2 ha (60m x 320m). Opening widths were chosen to represent 0.5, 1 and 2 tree heights. Same-sized openings are paired on the block according to soil moisture regime: one opening is treated as the control and the other opening will receive a specific treatment (eg. site preparation, different slope orientation). All openings are planted with Douglas fir, and natural regeneration ingress will be monitored along with seedling survival and growth. Seed fall and vegetation response will also be monitored in a portion of the openings. Measured variables (eg. seedling growth, vegetation cover) will be compared between treatment and control openings using t-tests.

This project is located at Viewland Mountain in the ICHmk3 near Horsefly. It has broad application in all high snowfall MDWRs in the Cariboo Forest Region, in particular in the 100 Mile, Horsefly and Quesnel Forest Districts.

Status: Existing Project

Objectives:
In the ICHmk3 biogeoclimatic subzone in the Cariboo Forest Region, Douglas-fir stands tend to be even-aged. These seral forests are eventually replaced with western red cedar—subalpine fir climax communities. Douglas-fir stands within this wetbelt ecosystem are important to the forest industry and to wildlife. They are particularly valuable as mule deer winter range because of the snow interception cover, thermal cover, and Douglas-fir forage provided by mature and older trees. Douglas-fir stands in these ecosystems are typically clearcut, which effectively removes large portions of the winter range for long periods of time. Furthermore, regenerating these large clearcuts with Douglas fir is often difficult due to frost, snow press and/or vegetation competition. The typical silvicultural system used on Mule Deer Winter Range (MDWR) in uneven-aged Douglas fir is low-volume, single tree selection. This system is not ecologically appropriate for these even-aged stands

Knowledge gained from this pilot study will be used in implementation of the CCLUP Mule Deer strategy and Mule Deer targets.

Armleder et al. (1986) developed the Handbook for Timber and Mule Deer Management Co-ordination on Winter Ranges in the Cariboo Forest Region to provide information on harvesting drybelt Douglas fir stands on low to deep snowfall MDWRs. It is the main management tool used by the forest industry and government for developing MDWR plans, operational plans and silviculture prescriptions. This research project will contribute valuable data and information towards updating the handbook to include very deep snowfall MDWRs. Information on regeneration requirements will benefit operational staff in the preparation of silvicultural prescriptions for even-aged interior Douglas-fir stands in wetbelt ecosystems

This research will also add to our understanding of Douglas-fir natural regeneration dynamics and to the environmental conditions required for re-establishing Douglas fir on these sites after harvesting.

Describe Tasks, Deliverables, Targets and Milestones:
All openings are planted with Douglas fir, and natural regeneration ingress will be monitored along with seedling survival and growth. Seed fall and vegetation response will also be monitored in a portion of the openings. Measured variables (e.g.. seedling growth, vegetation cover) will be compared between treatment and control openings using t-tests.
This project will be monitored until at least free-growing (approximately 7 to 12 years).

Cost Sharing: No additional funding is available.

Partnerships: Weldwood Williams Lake Division included this project in their 2001/02 Multi Year Plan

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
20,000	2	36,000	22,000	37,000	0	0	115,000	7-12

SSFM Issue # 12	Riske Creek Waterfowl Habitat Study	RMP-02-31

Summary:
Issue Focus: Identify characteristic cavity nesting habitat sites and suitable timber types within wetland ecosystems
Study Location: Riske Creek, Bechers Prairie area, however study considered applicable to similar habitat types in other geographic areas.

Status:
Existing study, first year completed. Second year of funding should allow for completion of doctorate study on this subject.

Objectives:
This study is intended to help identify suitable timber types and locations to promote habitat recruitment and provide for cavity nesting bird species within wetland/ forest complexes. These sites are becoming increasingly important in light of the current pine beetle infestation.

Describe Tasks, Deliverables, Targets and Milestones:
Phd thesis project. Anticipate identification of cost effective options to artificially maintain nesting habitat in wetland areas; as well as methods to effectively assess the habitat quality and suitability of specific wetlands.
Summer 2002 to complete field work, fall- winter to complete thesis document.

Cost Sharing:
West Fraser Mills Ltd. contribution enabled eligibility for NSERC funding ($13,800/yr) for thesis student.

Partnerships:
Phd thesis student – Matthew Evans, Simon Fraser University.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
5,500	1	5,500	0	0	0	0	11,000	2

SSFM Issue # 11	SSFM Performance Monitoring	RMP-02-32

Summary:
This project is linked to the 'Communications/Distribution' Activity.

The FRBC SSFM RMP process is co-ordinated and completed in the year before the plan is implemented. In order increase the probability of achieving the intended results, monitoring the implementation of the approved RMP is a critical activity. A reasonable place to start monitoring a plan progress is to have regular (quarterly) reports of the progress of the plan implementation. Some form of monitoring of the performance of individual projects is advisable.

Status: New project

Objectives:

- to ensure that each step in completing a specific project is completed in a timely and efficient manner
- to determine, in a timely manner, the risk of specific projects not being started and then completed
- to ensure that if problems arise with regards to specific projects that the appropriate actions are taken to compete or replace the project
- to ensure that the total budgeted funds are spent within the planned fiscal year

Describe Tasks, Deliverables, Targets and Milestones:

- at the start of the plan year ensure that each involved party is aware of their responsibilities and timelines
- at the end of each quarter (June, Sept, Dec, March) survey the participants and summarise the current status of each project
- if circumstances require, a small team of agency and licensee representatives can meet to discuss and address issues as needed

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	3,000	0	0	0	0	3,000	1

SSFM Issue #11b	Communication/Distribution	RMP-02-33

Summary:
This project is linked to the 'Performance Monitoring' activity

In order to achieve maximum value from the FRBC SSFM expenditures, communication and distribution of the products of the individual activities and projects is required. At the conclusion of a specific activity, project or RMP, information regarding the findings, conclusions, observations, hypothesis or unknowns is required. A 'low tech' approach is recommended in the short term, as we expect that there are other groups better suited to have responsibility for this task, but they may not be in place at the time of the completion of this RMP.

Status: New project

Objectives:

- provide a 'low cost', 'low tech' ability to communicate the results of FRBC SSFM activities and projects
- make available a 'low cost' 'low tech' methodology for distributing material or products as needed or requested
- hand-off this task or responsibility to a suitable group at the earliest convenience

Describe Tasks, Deliverables, Targets and Milestones:

- at the conclusion of each activity, make a record of the deliverable (report, map, field cards, etc) and who is responsible for 'holding or archiving' the deliverable
- summarise, at least once per fiscal year, the above information for each project or activity include this information with the next RMP plan in order to 'link' the various years plans in a more open and visible manner

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	37,000	0	0	0	0	37,000	1

SSFM Issue # 8	Monitoring Site Index	RMP-02-34

Summary:
This project applies specifically to TFL 52, but the methods and information derived will complement regional and provincial site index data.
Approximately 75 permanent sampling plots will be installed over a three year period to monitor the growth projections of the site index adjustment used in the 2001 timber supply analysis for TFL 52.

Status: Existing
Site index adjustments based on the TEM resulted in a significantly higher growth prediction. Because of the importance of having monitoring data in time for the next timber supply analysis, West Fraser, at it's own cost, installed 25 permanent sampling plots in 2001. More plots will be installed in the next two years.

Objectives:
The objective of the monitoring plots is to validate the site index used in the timber supply analysis, and to make adjustments if necessary.

Describe Tasks, Deliverables, Targets and Milestones:
Summer 2002, 2003 – install approximately 25 PSP's in each summer.
Summer 2006, 2007, 2008 – fifth year re-measurement
Winter 2008-9 – analysis of re-measurement data for use in timber supply analysis in 2010

Cost Sharing:
West Fraser installed 25 PSP's in summer of 2001 at it's own cost of approximately $75,000.

Partnerships: None.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
$177,000, 70,000	2000 2001	70,000	70,000			50,000	437,000	7

SSFM Issue # 8	Phase II Vegetation Resources Inventory Plots – TFL 52	RMP-02-35

Summary:
West Fraser completed a vegetation resource inventory on TFL 52 in 2000. The inventory audit indicated a difference of up to 10%. The Phase II plots are intended to adjust the inventory to more closely match the audit results
Approximately 100 randomly located sample plots will be located across the TFL. The subsequent analysis will be used to develop an independent regression factor to adjust the inventory.

Status: New

Objectives:
To obtain reliable data to allow adjustment of the inventory to more closely match the inventory audit results. Approximately 75 sample plots will be established in 2002 and another 25 plots in 2003.

Describe Tasks, Deliverables, Targets and Milestones:
Establish 75 sample plots in 2002, and another 25 sample plots in 2003. Analysis of data will be done in winter of 2003/04

Cost Sharing:
West Fraser paid $1.3 million for the basic inventory, FRBC contributed $30,000 for a small portion of the incremental vegetation inventory component.

Partnerships: None

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
$1.35 million	1	180,000	70,000	25,000	0	0	1,625,000	4

SSFM Issue # 2	'Modified Harvest' Valuation Discussion Paper	RMP-02-36

Summary:
This project is linked to:

- various land use issues (MDWR, East and West Caribou)
- SP Pilot Study for Modified Harvest Areas
- Merchantability pilot/study
- Timber Access Pilot/Study
- North Arm Quesnel Lake Adaptive Management Study

At the completion of the Integration process, several controversial land use issues were addressed within the context of the land use planning process by:

- Protecting significant portions of the regional landbase from extractive resource use.
- Requiring some form of modified harvest in other areas within these controversial land use issues to assure that the timber access targets could be achieved.
- An open and inclusive discussion of the issues, concerns, abilities and unknowns regarding the reasons for and economic considerations of these kinds of harvest prescriptions will set the stage for recommendations and facilitate the ensuing deliberations on this issue.

Status: New project

Objectives:
In order to support and encourage the development of new and innovative harvesting practices, a reasoned and appropriate assessment of the costs and benefits of these modified harvesting practices is recommended. There are many different land use situations where modified practices are called for: Caribou East, Caribou West (2 different prescriptions), MDWR (potentially many variations to consider) and other equally important landuse areas. These modified harvest prescriptions have potentially created additional costs related to achieving the intended land use objectives, but the economic measure of additional costs has not been studied.

Describe Tasks, Deliverables, Targets and Milestones:
In order to get a sense of the extent and complexity of this particular issue it is recommended that a small group of industry and agency staff be brought together to examine, discuss and report on this topic, possible under the guidance of the THDC or other suitable body. This group would be tasked with the following responsibilities:

- identify the areas, topics and individuals of interest for this project (completed within 3 months)
- develop an approach, strategy, outline, methodology, etc (completed within 6 months)
- seek recognition/approval from the agency/industry regarding the approach, etc (completed within 9 months)
- implement the approach and report as needed to the agency/industry group(s) (completed within 18 months)
- finalise a discussion paper and if possible recommendations (completed within 24 months)
- complete the total process within 24 months of the start date (completed within 24 months)

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$15,000	$15,000	0	0	0	30,000	2

SSFM Issue # 7	Short Term Timber Access	RMP-02-37

Summary:
This project is linked to:

- All CCLUP Land Use Strategies
- All SRP Processes
- Biodiversity Patch Size Analysis, Old and Mature Seral Targets
- Landscape Level Planning
- MDWR Management Plans
- MDWR Merchantability Pilot/Study
- MDWR OGMA Prescription
- MDWR Timber Access Target Pilot/Study
- Land Use Plan Monitoring Discussion Paper
- Monitoring Timber Access Targets

The CCLUP and the Integration Report provide direction regarding long term timber access at the zone and sub-zonal levels. The sub-regional planning (SRP) processes refine this direction for smaller land bases (districts and eventually landscape units) for the long term. Measuring or comparing the intended long term timber access and 'current management' is a necessary beginning to determining the current timber access, which can then be compared to the long term timber access target direction provided by the CCLUP and Integration Report.

The measurement of current timber access is a relatively new measure or requirement, and therefore the required skill, capability and tools are still being developed. The licensees have been attempting to accomplish this development work over the past eight to twelve months using the Horsefly SRP as a pilot process.

At this time, the 'short term' is described as some period of time longer than 20 years and shorter than 40 years (this definition is open for discussion).

Status:
Ongoing project, the licensees in the region have been funding the work accomplished to date for the Horsefly SRP.

Objectives:
At the SRP planning level, the intention of this project is to:

- translate the direction given in a specific SRP for each land use strategy:
  - determine how to achieve this direction where required (ex: MDWR)
  - determine how each land use strategy direction can be modelled spatially and temporally for the short term (20-40 years)
- for all land uses together, determine:
  - how the land uses interact spatially and temporally
  - specifically address the biodiversity old growth retention and patch size issues
- for timber access, determine:
  - how to measure timber access in the short term (area based)
  - as required, relate and understand the short and long term timber access measurements

Describe Tasks, Deliverables, Targets and Milestones:
Using the completed SRP product:

- spatially and temporally display the land use strategy direction as required
- model the resultant land use pattern in terms of area flow over discreet planning periods while managing for the various area based constraints from land use, timber and non-timber aspects (FRC, CCLUP, etc)
- summarise and report area flow over time for all land uses to measure the achievement of timber and other land uses targets (includes suitable data packages, technical reports, etc)
- it is reasonable to expect that a single SRP short-term timber access assessment would take completed in 3-5 months.

The schedule for this process is completely dependent upon the completion of SRP processes, which is a significant unknown in terms of developing a schedule. At this time, we estimate that there is a reasonable potential for the following SRP's to be completed either during the remaining months of this fiscal year or during the next fiscal year, which would allow this form of planning to begin at the SRP level:

- Horsefly SRP (work is substantially completed for this SRP)
- 100 Mile House SRP
- Williams Lake SRP
- Chilcotin SRP.

At this time we are uncertain as to the status of the Kluskus SRP and its probability of completion this or next fiscal year. Our objective would be to complete three SRP's in the fiscal year that this RMP represents.

Cost Sharing: The Cariboo licensees have already contributed funds to the initial development of this process

Partnerships: Cariboo licensees

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	250,000	0	0	0	0	250,000	1

SSFM Issue # 7	SP Pilot/Study for Modified Harvest Areas	RMP-02-38

Summary:
This project is linked to:

- All CCLUP Land Use Strategies with Modified Harvest Requirements
- Biodiversity Patch Size Analysis, Old and Mature Seral Targets
- MDWR OGMA Prescription
- Land Use Plan Monitoring Discussion Paper
- Monitoring Strand Level Forest Management on MDWR

Silviculture prescriptions (SP's) are statements of intent that outline objectives and intended results. Our land use objectives within these modified harvest areas are much more complex and we expect to have entirely different results when compared to non-modified harvest areas. On the one hand, we are striving to meet the non-timber objectives with regards to wildlife habitat or biodiversity attributes, and on the other hand we are striving to attain the intended level of timber access. The SP is the control mechanism to ensure that both the non-timber and timber objectives as outlined or prescribed in the appropriate strategy document are achieved. Many questions need to be asked:

- assuming that the actual practice follows the SP, then what, if any obligation remains for the SP proponent at the conclusion of the harvest?
- will the 'typical' regional stocking standards be in effect for these modified areas, and do we need to develop modified stocking standards for every combination and permutation of modified prescriptions?
- what is the life of an SP for a modified harvest area (perhaps only somewhat longer than the life of the cutting permit or the harvest activity itself)
- more questions ……?

In terms of SP's we need to ensure that the modified harvest requirement is well understood and the harvest opportunity with regards to proposing, planning and implementing modified harvest practices throughout the region is available as required. These SP/modified harvest issues should be addressed at some time in the near future.

The proposed funds will be used to support a suitable person (licensee, agency, consultant, academic, etc) to co-ordinate and facilitate a small but dynamic group of individual representing a cross section of appropriate people from throughout the region. This group would be under the guidance of and existing agency/industry sponsored body (THDC, Implementation Committee, SDM's, etc).

Status: New project

Objectives:

- to establish a small but pro-active group to develop and then address this project (made up of joint industry and agency players)
- to communicate with (in some manner) the resource planning practitioners in the region
- to develop a list of questions, uncertainties, assumptions, etc
- to assess the current situation and propose recommendations for the future

Describe Tasks, Deliverables, Targets and Milestones:

Two year timeline in order to provide adequate time for various groups and committees to be engaged in the process

several products are possible:

- early questionnaire or situation assessment document
- midterm product could include a discussion of the issues that have been identified to date
- final product could include an issues statement, and recommendations on how to address them

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	15,000	15,000	0	0	0	30,000	2

SSFM Issue # 1B	Management Guidelines for Douglas-fir stocking densities to integrate tree growth, biodiversity objectives and forage production in the IDF.	RMP-02-39

Summary:

The proposed project will assess the implications of tree stocking densities to tree and stand growth and understory vegetation development in multi-layered Douglas-fir stands, especially in the IDFxm. These assessments will provide information to support development of stand management guidelines under the Cariboo-Chilcotin Grassland Strategy. The data will provide a basis for evaluating the implications of different stocking densities and stand structures to timber production, biodiversity attributes, and forage for livestock and wildlife. The data can also be used to help validate a growth model (Prognosis^{BC}) for multi-layered stands in the IDFxm.

The project will collect and summarise data from several (approximately 30) Douglas-fir stands with a range of stocking densities. Data will include stocking density (basal area and stand density index), 10 year tree and stand basal area increment, estimated tree and stand volume increment, and undergrowth vegetation composition and abundance. Data will be collected from fixed-area plots systematically located in stands selected to represent a range of stocking densities on ecologically similar sites.

The project will sample stands primarily in the IDFxm in the Williams Lake, 100 Mile House, and Chilcotin Forest Districts. The results will have application to the IDFxm (237,000 ha) and, to a lesser degree, the IDFxw (35,000 ha) and IDFdk (1,300,000 ha).

Status: New

The relationships of Douglas-fir stocking densities to tree and stand growth, wildlife tree recruitment, understory vegetation, and forage production is not well known. This new information is needed to develop harvesting and stand management guidelines that integrate objectives of timber production, biodiversity conservation, grassland conservation, livestock forage, and mule deer winter range. It is needed especially for further development of the Cariboo-Chilcotin Grassland Strategy. Studies in B.C. and the U.S. suggest that reductions of high stocking densities may increase stand growth and lumber recovery as well as enhance biodiversity attributes and forage production.

Objectives:

The objective of the proposed project is to assess the effects of tree stocking density and stand structure on timber production, biodiversity attributes, domestic livestock forage, and wildlife habitat in multi-layered Douglas-fir stands, especially in the IDFxm. These assessments are needed to support development of stand management guidelines, under the Cariboo-Chilcotin Grassland Strategy, that effectively integrate timber, biodiversity, wildlife, and livestock objectives.

Describe Tasks, Deliverables, Targets and Milestones:
The project is proposed for two years. Field data will be collected in the first and second years and initial data summaries and analyses will be completed in the second year. Specific products will include field data from approximately 30 stands and a report summarising the data and the results of the data analyses. Data analyses will include relationships of tree stocking density to tree and stand level growth and undergrowth vegetation. The report will discuss implications of the analyses for development of stand management guidelines under the Cariboo-Chilcotin Grasslands Strategy.

In order to meet needs for integration of strategies (Grassland, Mule Deer Winter Range, and Timber), the project will need to be initiated in 2002/2003. The report will be completed by March 31, 2004.

Completion of data collection – October 2003
Completion of final report – March 2004

Cost Sharing: No cost sharing is included.

In-kind Contributions:

- Data summaries and analyses: Ministry of Forests, Research Section – 15 person days
- Report Preparation: Ministry of Forest, Research Section – 12 person days

Partnerships:
Ministry of Forests, Research Section will summarise and analyse data and prepare the final report. No other partnership commitments are included.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	15,000	18,000	0	0	0	33,000	2

SSFM Issue # 8	Change Monitoring Inventory	RMP-02-40

Summary:
For Timber Supply Review purposes, used to monitor the change in the forest inventory type and identify any key problems, diseases, managed stands growth rates that appear to be different then predictions. These problem areas or types will be further investigated in the specific areas of the Cariboo Region as required.

This program is also required for the support of continuing sales of forest products on a global market and from a British Columbia market program with the United States. This program will be designed for the Cariboo Region.

Status:
New

Objectives:
Assist in the design and implementation of Change Monitoring Inventory system.
To establish up to 20 Randomly located plots in the Cariboo Region.

Describe Tasks, Deliverables, Targets and Milestones:

- Design of the CMI program including test plots, data collection design. Completion by December 2002
- Implementation of the sampling design and collection of 20 plots on a continuous yearly basis during the summer months.
- Data compilation by March of the following year for the previous years data collection.
- Any special needs areas to be identified after the completion of the compilation for the following summer's data collection season.

Cost Sharing: None

Partnerships: FRBC

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	70,000	70,000	70,000	0	0	210-,000	3

SSFM Issue #: 9	Managed Stand Plots for Growth and Yield	RMP-02-41

Summary:
Data used for Timber Supply Review purpose. Allows for increase of productivity, where applicable, to be used in AAC determinations by the Chief Forester, in stands that are now managed. Relates to issue # 9 Timber Enhancement.
The program should be designed to address the long-term effects of treatments such as spacing and fertilizing in the Cariboo Region. It should be designed to allow the address the individual needs of key stand types such as pine spruce and Douglas fir. This program will be designed in conjunction with the Change Monitoring Inventory currently under development.

Status: New

Objectives:
- Assist in the design and implementation of Managed Stands Growth and Yield plots in areas where the Change Monitoring Inventory prediction systems is different from what actually exist operational in stand growth.
- To establish up to 40 plots in the Cariboo Region.

Describe Tasks, Deliverables, Targets and Milestones:
- Design of the Managed Stand Program including test plots, data collection design. Completion by December 2002
- Implementation of the sampling design and collection of 40 plots on a continuous yearly basis during the summer months in target areas.
- Data compilation by March of the following year for the previous years data collection. Additional needs to be identified at this time.

Cost Sharing: None.

Partnerships: FRBC

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	50,000	70,000	70,000	0	0	190,000	3

SSFM Issue # 6	Monitoring Stand Level Forest Management on Mule Deer Winter Ranges	RMP-02-42

Summary:

The project objective would be to develop a monitoring protocol for stand level management practises on mule deer winter ranges and then to apply the protocol to monitor stand level treatments on mule deer winter range across the region. The monitoring would include residual stand structure, the pattern of skid trails and landings, and regeneration. It is expected that both the government agency mule deer committee and the CLMA mule deer working group would provide significant input to the development of the monitoring protocol.

The first two years would focus on stands in the Interior Douglas-fir zone. Subsequent years work would move to the Sub-boreal Spruce zone and/or the Interior Cedar Hemlock zone.

Status:

This is a new project.

Under Issue #6, "Mule Deer Management Planning", the SSFM issue analysis document describes the "need to develop management plans, pilot testing and monitoring systems to assist in successful implementation of the CCLUP." This project will be a step in addressing the need for the development of pilot testing and monitoring systems.

Good stand level management is critical to integrating timber and habitat goals on mule deer winter ranges in the Cariboo Forest Region. This is reinforced by the direction given in the Cariboo Chilcotin Land Use Plan which mandates the development of winter range plans which increase timber access but require carefully planned and implemented harvesting. Government agencies have given substantial guidance on stand level management of mule deer winter range habitat. Recent written guidance includes the Draft Williams Lake/Chimney Mule Deer Winter Range Management Plan in June 1999, "Structural Definitions for Management of Mule Deer Winter Range Habitat in the Interior Douglas-fir Zone" updated in August 2000 and the "Recommended Interim Management Guidelines for Mule Deer Winter Range" put out in November of 2000. The Mule Deer Working groups from both the CLMA and Government Agencies have recommended the development of monitoring strategies for management of habitat on mule deer winter ranges.

Objectives:

To ensure successful implementation of the CCLUP direction on mule deer habitat, it is essential to monitor how the guidance provided by government is being interpreted and implemented in the field. This project will develop and implement a monitoring program for stand level treatments on mule deer winter ranges.

Describe Tasks, Deliverables, Targets and Milestones:

Phase 1: (2002/03) Develop and field-test a monitoring protocol. End product: A report describing the tested and revised stand level monitoring protocol. This protocol would provide the methodology for the monitoring program to be completed over the next three years. Report - March, 2003.

Phase 2: Implement monitoring starting with the winter ranges in the Interior Douglas-fir zone and then moving to winter ranges in the SBS, SBPS and ICH zones. End product: A report at the end of each project year describing the monitoring program undertaken and detailing the results of the monitoring. These monitoring reports would be used to refine stand level management on mule deer winter ranges. Reports in March, 2004, 2005 and 2006.

Cost Sharing:

In-kind contributions of staff time will be required from MOF, MLAWP and the CLMA Mule Deer Working Group to develop the sampling protocol.

Partnerships:

The Mule Deer Working groups from the Government Agencies and the CLMA have both recommended the development of monitoring strategies for management of habitat on mule deer winter ranges. This project would be a first step in development and implementation of a monitoring strategy. The two groups would both input into development of this project. Expertise from the UBC Research Forest and MOF Research section would be utilised to design the sampling regime.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	20,000	20,000	20,000	20,000	0	80,000	4

SSFM Issue #1b	Increasing our Knowledge of the Life Cycle of Dead Wood	RMP-02-43

Summary:

This project will collect data on the dynamics of snags and CWD in local forest ecosystems using both a retrospective approach and by establishing permanent sampling plots.

In the retrospective component, the decay state and time since tree death would be determined for standing and down dead trees covering a wide range of size and decay state in a variety of forest ecosystems. From this data, relationships between tree size, time since death and decay state would be determined for each ecosystem studied. The project would also establish and sample at least two long-term research plots to monitor the recruitment and decay of dead wood over time. These long-term plots would also provide the opportunity to study the functions of specific pieces of dead wood and how these functions change over time. The combination of short-term retrospective sampling with long-term plots will provide useful management information in the short term but will also provide a means to improve our understanding over time. The funding would be used to hire a Co-op student to work with the MOF research section staff to carry out this project.

The first year would focus on stands in the Interior Douglas-fir zone. Subsequent years work would move to the Sub-boreal Spruce zone and/or the Interior Cedar Hemlock zone.

Status:

This is a new project. It would fall under the Stand Level Biodiversity knowledge strategy under the "Attribute" section that recommends the " collection of additional data regarding stand level attributes such as CWD through inventory projects."

Objectives:

This project would increase our understanding of the dynamics of dead wood in forest ecosystems within the Cariboo Forest Region. This understanding will help forest managers to plan inputs of dead wood to maintain ecosystem functions over time.
Dead wood in forest stands is a key stand level biodiversity attribute that plays numerous roles in the functioning of forest ecosystems. These roles include wildlife habitat, habitat for mycorrhizal fungi and nitrogen fixing bacteria, moisture holding substrate and nurse logs for seedlings. The value of snags and cwd for each of these roles depends on the size and decay state of the deadwood. At the present time, we have limited knowledge of the time required for dead wood in our forested ecosystems to move through the various stages of decay. This project would improve our knowledge of snag and cwd decay rates and thus help forest managers to plan inputs of dead wood to maintain ecosystem functions over time. Decay rate information is also required to provide accurate modelling and analysis of snag and cwd supply over time.

Describe Tasks, Deliverables, Targets and Milestones:
The deliverables include:

- Annual reports summarising the data collected on snag and CWD decay rates. Reports completed March 2003, 2004, and 2005.
- A final report describing the establishment of long-term sampling plots. Report March, 2005.

Cost Sharing:
Completion of this project would require in-kind contributions of staff time from MOF Research section staff to design, implement and report the study. Project funding would be for field assistance.

Partnerships:
No formal partnerships are in place, but input from the Regional Timber Harvest Development Committee would be welcome. This Industry/Government Committee recommended increased research into issues relating to the supply of dead wood in its report on "experimental harvesting practises."

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	17,000	17,000	17,000	0	0	51,000	3

SSFM Issue # 10	Lake Inventory	RMP-02-44

Summary:
There are approximately 3280 lakes within the Cariboo Forest Region (MELP Region 5 portion) greater than 5 ha. In addition to providing important fish habitat many of these lakes are valuable for recreation. Knowing the fish habitat importance and understanding the recreational significance of lakes are the main objectives of lake inventory program. Some of the required lake inventory information will be collected during 1:20,000 watershed wide lake and stream inventory, however, most forest companies are opting out of lake inventory and MELP will have to address the problem. Key lakes outside of forest company priority watershed-level inventory must be inventoried to provide information for Lakes Classification Committees and provide baseline information to support recreational management and other identified objectives of land use planning.

Status: Existing, not funded in 2001/02, continuing from 2000/01

Objectives:
Lake inventory will continue at a rate of 20 lakes per year to address the important lakes in the next 5 to 10 years. MSRM and WLAP, in consultation with Forest Companies, will provide the key roll in determining the lakes to be inventoried and contract out the work. Information will be collected to RIC standards. Information from the surveys will be integrated into Regional and Provincial databases and interpreted information will be provided to the Lakes Classification Committee. Lake inventories will provide the information required for determining sensitive fish habitats, recreational fisheries management options and classification of lakes and lakeshores.

Describe Tasks, Deliverables, Targets and Milestones:
Production of lake inventory reports, integration of information into the Regional and Provincial databases, making information available to various sources and the integration of the information into watershed forest planning through the lake classification process. Products will be provided by March 31, 2003.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
900,000	6	100,000	100,000	100,000	100,000	100,000	1,400,000	11

SSFM Issue # 13	Terrain and Terrain Stability Classification in Selected Areas of the Cariboo Forest Region	RMP-02-45

Summary:
To date, in the Cariboo Forest Region, TSM (*reconnaissance and detailed levels) for nearly 1,263,000 ha of land has been completed. The completed area represents about 15% of the total land area (approximately 8,100,000 ha) of the Cariboo Forest Region.

The primary objective of reconnaissance map is to identify all unstable or potentially unstable land areas. These maps are useful for long-range planning and for establishing operability lines and allowable annual cut netdown procedures. These are also effective tools for identifying land areas where more detailed mapping is required.

Specific areas selected by multi-year agreement holders will be targeted.

Status:
This is an existing activity, RMP-01-44

Objectives:
To maintain productivity and renewal capabilities of natural resources such as forestry, agriculture, wildlife, recreation and water production, the productivity and extent of the landbase must be maintained. To conserve the landbase, resource development activities such as logging (road building, landings, etc.) as well as silviculture activities, should be conducted in such a way that they do not cause landslide or mass wasting and/or soil erosion.

Some types of terrain are more susceptible to damage by these activities than others. Terrain and terrain stability classification maps (TSM) identify the susceptibility of sites in the landbase to mass wasting and erosion. These are used to assist the managers or planners, and the field personnel, to determine site susceptibility for different types of machinery, logging methods, and where to best locate access roads.

Describe Tasks, Deliverables, Targets and Milestones:
Detailed terrain mapping is conducted to collect and present information about the physical characteristics and properties of the land surface, and to provide detailed interpretative data on terrain stability conditions within forest development planning area. These maps identify areas that require on-site assessment of terrain stability prior to approval of road construction, cutblock boundaries, timber harvesting methods, etc. Projects started in 2001/02 will be completed this fiscal year.

Cost Sharing:
No cost sharing or in-kind contributions are included.

Partnerships:
There are no partnership commitments.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$25,000	0	0	0	0	25,000	1

SSFM Issue # 3	Spacing Trial	RMP-02-46

Summary:
This project is linked to:

- Satah Mountain Adaptive Management Trail
- Satah Mountain Adaptive Management Trail Habitat Use Monitoring
- Spacing and fertilisation trial within repressed pine stands within the Caribou modified harvest zone

Status:
Existing project, to replicate findings from the Rosita fire trials in additional repressed pine stands.

Objectives:

- to determine if spacing will increase growth of repressed pine
- to determine if fertilisation will increase growth of repressed pine
- to determine of a combination of fertilisation and spacing will increase repressed pine compared to spacing or fertilisation alone
- to compare the response of seedlings to fertiliser applied at time of planing on each rehabilitation treatment
- to compare the growth of the planted trees with the present growth of the untreated pine stand and the three stand tending treatments
- to provide a demonstration site for the various treatments
- to assess the impact on lichens by various treatments
- to determine if Caribou will begin to utilise these treated areas

Describe Tasks, Deliverables, Targets and Milestones:

- site location and work plan preparation
- trial site layout (includes lichen plots)
- pre-treatment data collection and data entry
- foliar sampling
- stand treatments
- fertiliser application and purchase
- treatment supervision
- post-treatment assessments (vegetation and lichen)
- data entry, working paper, extension notes, final publication

Cost Sharing: in-kind funds included

Partnerships: Ministry of Forests Research section, West Fraser Mills, Ministry of Environment

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
40,000	1	35,000	25,000	25,000	25,000	25,000	175,000	6

SSFM Issue # 13	Quesnel Lake North Arm Water Quality/Quantity Monitoring Program: Penfold Watershed	RMP-02-47

Summary:

- Overview of tasks: monitor harvesting impact on the Penfold Creek drainage
- Overview of geographic area covered : Penfold Creek Watershed, North Arm, Quesnel Lake
- Internal number 101327

Status: Existing

Objectives:

- Establish relationships between forest harvest activities and water quality and quantity as they relate to fish habitat and provide recommendations for forestry management as related to protection and maintenance of a water resource.

Describe Tasks, Deliverables, Targets and Milestones:

- A report detailing continuous streamflow and water quality data, stream sediment accumulation rates, stream sediment particle size distribution, fish habitat and channel morphology features in relation to pre and post harvesting activities at strategic monitoring locations in the water shed, providing where supported by the data collected, recommendations to forest managers relating to protection and maintenance of a water resource
- This is a multiyear project requiring annual reporting of the past year's data and findings.

Cost Sharing: NA

Partnerships: MWLAP, West Fraser Mills Ltd, Williams Lake Division, and Water Survey of Canada.

Investment to date		Investment Required						Total Years to complete
$$		$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
200,000	4	50,000	30,000	0.00	0	0	280,000	6

SSFM Issue #13	Automated Watershed Monitoring	RMP-02-48

Summary:

- Five years of data are to be collected at each site
- The information will be reviewed and cleaned up
- A report will be completed interpreting the data and comparing it to BC Water Quality Guidelines
- Information will be provided to various planning process and used for reports throughout the Cariboo Region
- Water Quality Objectives could be set based on the data gathered
- The five sites are spread throughout the Cariboo Region and reflect several different biogeoclimatic subzones, two hydrologic zones while bordering a third, and various watershed elevations and sizes including the most under-represented, those less than 100km2 in size. These different biogeoclimatic subzones include a variety of watershed descriptors and represent different climates, typology, soil types, and plant communities (Steen et al., 1997). Over the long term, the information collected can provide water quality and quantity characteristics for watershed types that can be used for guidance in water management of a similar watersheds within the Cariboo.

Status: Existing project.

Objectives: The goals are both research and operationally based as the information collected will provide more extensive knowledge to resource managers about the watershed and the activities that affect it.

Site Specific Station Objectives

Bridge Creek @ Forster's Residence

- To establish a long-term trend record of water quality and quantity that can be used to determine if changes are occurring
- To monitor the overall water quality of the upper watershed
- To ascertain the levels of nutrient loading to Horse Lake
- To supplement the Horse Lake data collection and reports
- To determine suitable uses (i.e. domestic, irrigation, etc.) of the water by comparing the water quality to the various levels of criteria
- To provide water quality and water quantity data that can facilitate in the assessment of the potential impacts of land use in the watershed

Sheridan Creek @ Pinchbeck's

- To establish a long-term trend record of water quality and quantity that can be used to determine if changes are occurring
- To monitor the overall water quality of the upper watershed
- To ensure that water quality meets the drinking water criteria for this potential community watershed
- To ascertain the levels of nutrient loading to McLeese Lake
- To monitor the potential input of metals and ensure compliance with the water quality criteria from the Gibraltar Mine.

Windy Creek

- To provide information on whether future forestry operations including watershed restoration results in any changes to water quality and quantity
- To ensure water quality meets the necessary parameters for this high value fisheries habitat

Judson Creek

- To provide information on potential impacts to water quality and quantity from current logging operations in regards to concerns about the impacts from past logging operations adjacent to the watercourses in this watershed and the overall state of the Bridge Creek Basin (Hart, 1995)
- To establish a long-term trend record of water quality and quantity that can be used to determine if changes are occurring
- To address concerns raised by the local Upper Bridge Creek Watershed Protection Society
- To supplement other monitoring work occurring in the Bridge Creek Basin

Dash Creek

- To establish a long-term trend record of water quality and quantity prior to forest harvesting in the watershed

Describe Tasks, Deliverables, Targets and Milestones:

Products will include the data itself and a report interpreting the data for MWLAP staff that could be used when considering land use activities in a watershed within the Cariboo Region. This information gathered will also be provided to various land use planning processes and may be used to develop Water Quality Objectives.

Future funding is anticipated to support each of the stations for approximately a five-year period to acquire sufficient data on the water quality parameters and stream flow. The schedule is described in the Resource Management Plan with the anticipated funding for Windy and Judson to include monitoring up to and including 2003/2004 while Sheridan, Dash and Bridge Creek are anticipated to be funded up to and including 2004/2005.

Cost Sharing:

Initial funding for the Bridge Creek monitoring station which purchased the equipment and funded the installation and early monitoring was provided to MELP by Forest Renewal of British Columbia (FRBC). For the Judson Creek monitoring station, The Upper Bridge Creek Watershed Protection Society received FRBC project and financial support for the initial funding period and this financed the installation and preliminary monitoring. Riverside Forest Products Ltd, Ainsworth Lumber Company Ltd., and Weldwood of Canada Ltd. are currently funding the operation of the automated monitoring stations from their FRBC allotment. This funding has financially supported monitoring, personnel, report completion, and co-ordination of the automated water quality program.

To make efficient use of the automated monitoring program, additional objectives, such as metals monitoring at the Sheridan Creek station, are included in the program to assist MWLAP in protecting the environment. MWLAP supplements the program by contributing to the costs of the automated water quality and quantity program. Funds from MWLAP encompass vehicle costs for snowmobiles, trucks, and ATV's, purchasing water-sampling equipment such as bottles, gloves, and coolers, as well as office overhead and laboratory charges.

Partnerships:

Andy Cooke and Rick White of Forest Technology Systems (FTS) have assisted with the project by supplying and installing the equipment and by providing technical support for the equipment and software. Burke Phippen of BWP Consulting Ltd. has been contracted to manage the three sites in the 100 Mile House area. Patti Meger, a co-op student, and Lori Miller, on auxiliary, have been hired by MWLAP to assist with the project. Ed Quilty of QA Consultants Ltd. was contracted to interpret the data and write an interim report. Ted Parry of Water Survey of Canada has been the lead in installing, maintaining and interpreting the hydrometric portion of the automated water quality and quantity program. Pacific Environmental Services was contracted to do laboratory analysis on the collected water samples.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
378,000	3	86,410	100,000	100,000	100,000	100,000	864,410	8

SSFM Issue # 6	MDWR Merchantability Pilot/Study	RMP-02-49

Summary:

This project is linked to:

- MDWR Management Plans
- SP Pilot study for Modified Harvest Areas
- JS/CT Study
- Timber Access Pilot Study
- Monitoring Stand Level Forest Management on MDWR

MDWR management plans are intended to provide direction regarding the timing and nature of timber access for both the long and short terms. Within the 'template' planning model, assumptions have been made with regards to timber access, merchantability and impacts (both positive and negative) on MDWR capability and suitability. This proposal specifically targets harvest opportunity type #4 (thinning from below), which is identified in the Williams Lake – Chimney MDWR Management Plan as a significant component of the total timber harvesting opportunity and represents a mix of MDWR habitat improvement and timber access opportunity.

Harvest opportunity type #4 is currently on the margin or perhaps even outside of what we consider the 'normal' harvest opportunity for uneven aged management, and as such requires investigation and analysis with regards to the 'operational' harvesting issues such as merchantability, machinery selection and adaptation, crew training, valuation and marketability of the solid wood products produced from such a highly modified harvest prescription.

MDWR areas cover a significant proportion of the forest landbase in the region, with the majority of the MDWR area in the 100 Mile House and Williams Lake TSA's. More importantly, within the context of the landuse planning process these areas are intended to deliver multiple land uses (wildlife, timber, recreation, visual, biodiversity, etc), and as such required additional sensitivity analysis and attention to detail.

Status: New project

Objectives:

Overall, the project is intended to develop a pilot study of several sample areas within the Williams Lake–Chimney MDWR in order to learn more about the harvest opportunity type 4 proposal. In point form, the project would be structured as follows:

- identify several candidate areas within the Williams Lake-Chimney MDWR for a pilot study (suggest two areas, approximately 10 hectares in size, with different stand characteristics)
- harvest and then assess the 'economic' and 'operational' realities of the pilot areas

Describe Tasks, Deliverables, Targets and Milestones:

- analyse and measure the stands prior to harvest
- design and layout the harvest plan in order to achieve both the mule deer and timber objectives
- carryout the harvest plan, with appropriate monitoring of physical, biological and economic criteria in order to properly address and understand the results
- analyse and measure the stands after the harvest
- analyse and measure the volume generated from the stands
- assess the 'viability' of the pilot for the study area(s), write a report, propose improvements or changes to the learnings, and then retest if necessary or apply the learnings to the remainder of the MDWR area

Cost Sharing:

- the licensees have already invested some time and money into a 'virtual' (no actual harvesting has take place) trial measurement of two small areas within this MDWR

Partnerships: none to date

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$100,000	0	0	0	0	100,000	1

SSFM Issue # 8	SIBEC Plots	RMP-02-50

Summary:
The data is used for operational stand growth predictions and for calibration in the Timber Supply Review.
The design needs to cover specific BEC zones in the Cariboo Region that lack sufficient data for a high confidence level in site index.

Status:
New/Existing, Develop a specific strategy to fill the needs of the missing data needs.

Objectives:
To design and install a temporary sampling plot sampling list for the BEC zones in the Cariboo Region that are currently without sufficient data for ensure a high confidence level in the site index estimates by site series
Initial set up in one year and a continuing sampling program of 40 plots per year until the sample requirements are completed. Examine other methods of collecting the sample data such as using the permanent sample plot program etc.

Describe Tasks, Deliverables, Targets and Milestones:
Design sampling program and start establishing plots in 2002.
Continue sampling 40 plots per year until the gaps are filled.

Cost Sharing:
None.

Partnerships:
FRBC

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
?	?	25,000	10,000	10,000	10,000	0	55,000+?	4+?

SSFM Issue # 8	Operational Adjustment Factor (OAF) Study for TIPSY	RMP-02-51

Summary:
The TIPSY stand growth model uses OAFs to adjust for losses to site occupancy and other factors to generate a volume estimate for each growth type. This is used in the TSR/TFL processes to determine future timber supplies.

TSR2 used OAF 1 values of 12 – 15% and an OAF2 value of 5%. The TIPSY model assumes fully stocked stands. OAF 1 is used to adjust the model for less than full stocking, i.e. gaps and voids in stocking due to unmapped non-productive areas within a block. OAF2 adjusts the TIPSY model for losses due to disease over time. OAF2 starts at zero for young stands, gradually increasing up to 5% by 100 years (stand age).

The Quesnel TSA was started in 2001/02, no funding was provided to complete in the current fiscal Year, an additional $ 50,000is required to complete the Quesnel TSA. The Williams Lake TSA will commence in 2001/02 and will require further funding ($30,000) in 2002/03 to complete. The 100 Mile house TSA is scheduled for 2002/03, $100,000 will be required.

Status:
This is an existing ongoing project, RMP-01-43

Objectives:
The new knowledge will provide greater certainty in the predictions of mid- and long-term available volume timber estimates in TSR3.

Describe Tasks, Deliverables, Targets and Milestones:
- OAF surveys in all three TSAs to be done using approved OAF methodology as approved by Victoria.
- Individual projects will be identified in multi-year agreement holders' workplans.
- This project will provide the necessary data needed to confirm the TSA-specific TIPSY OAF reductions needed for TSR purposes.
- This project will need to be completed prior to 2004 to be used in TSR3

Cost Sharing:
No cost sharing

Partnerships:
No partnerships

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
150,000	2	180,000	0	0	0	0	330,000	3

SSFM Issue #:	Activity: Quesnel Lake Kokanee	Activity #:

Summary:
Kokanee use both river and shoal areas for spawning in the Quesnel Lake watershed. These spawning areas are very susceptible to degradation resulting from development of the adjacent land base. Inventory of the adults using the various spawning areas have not been carried out in recent years and have never had an extensive study undertaken.

Quesnel Lake kokanee will be inventoried at the juvenile stage by echo sounding, trawls and DNA work. Spawning areas used by kokanee adults will be carried out by aerial counts, boat reconnaissance and dive studies. RIC standards will be adhered to where available.

Status: existing

Objectives:
Inventory information from the above project areas will provide important fish and fish habitat information on the kokanee in the Cariboo Region.

Intensive fish inventory will provide information to develop measures to protect sensitive fish stocks not only within the Quesnel lake drainage but also other large lake drainages within the region.

Kokanee inventory will be carried out within Quesnel Lake as well as the major tributary streams such as the Horsefly and Mitchell Rivers.

Describe Tasks, Deliverables, Targets and Milestones:
Production of individual reports outlining data collected and recommendations to be included for future forest development in the specified project areas. Integration of the general information collected and the integration of the information into Regional and area-specific planning processes.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
75,000	1	75,000	0	0			75,000	1

SSFM Issue # 8	Growth and Yield Permanent Sample Plot (PSP) Maintenance throughout the Cariboo Forest Region	RMP-02-53

Summary:
Growth and yield samples in natural stands have been established throughout the province since the early 1970's. Maintenance activities are carried out on a regularly scheduled basis.
This project will be carried out throughout the entire Cariboo Forest Region

Status:
This is an existing ongoing project.

Objectives:
In order to ensure the retention of the investment in establishments, maintenance activities must be carried out as scheduled. As the age of the samples increases, the value of the investment in permanent sample plots also increases, as does the risk of loss.

Describe Tasks, Deliverables, Targets and Milestones:
Growth and Yield samples have maintenance activities (Update of access notes, refreshing of paint lines, re-nailing where required, estimation of ingrowth, etc.) carried out on a scheduled basis.

This project will be carried out indefinitely into the future.

Cost Sharing:
No cost sharing.

Partnerships:
No partnerships.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
30,000	2	15,000	15,000	15,000	15,000	15,000	105,000	indefinite

SSFM Issue #8	Vegetation Resource Inventory – Phase II 100 Mile House TSA	RMP-02-54

Summary:
The current Forest Inventory is based on the Unit Survey completed in 1976. Since then, there have been periodic updates. However, in the past there was no sampling frame or means of compiling the information to provide statistical validity. The VRI was developed to determine the amount of vegetation cover in the province, the location of the vegetation resources and changes in the vegetation amount, and to conduct monitoring. As Phase 2 plots are established, the Forest Inventory becomes more reliable at a detailed level.

Status: Existing RMP-01-33C

Objectives:

- Recent forest audit results show that the inventories in the Cariboo Forest Region of the 1970's and portions of the 1990's overestimated volume. The inventory requires an adjustment through the Vegetation Resource Inventory (VRI) process.
- The new knowledge can be incorporated into TSR3 estimates of volume.
- Long-term harvest rates can be more accurately determined on a local (TSA) basis.
- Will allow for more accurate estimate of site specific volume in Forest Inventory.

Describe Tasks, Deliverables, Targets and Milestones:
Establish 100 Phase 2 plots for the next three years for a total of approximately 300 plots relating to the validity of the existing Forest Inventory

Cost Sharing:
No cost sharing.

Partnerships:
No partnerships. MYA holders have been delivering the projects in the past with assistance from MOF.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
150,000	1	150,000	150,000	85,000	0	0	535,000	4

SSFM Issue # 6	Mule Deer Population Inventory	RMP-02-55

Summary:
Populations inventories are needed to determine if the regional population objectives are being met. This would be accomplished by completing aerial surveys on one to two winter ranges during December to January, and completing spring surveys from the ground during April to monitor population trend. Long-term monitoring of a representative proportion of the regional deer population would be required to detect population fluctuations and monitor herd status and health over the long term.

This project would take place within Management unit 5-03.

Status: New

Objectives:
Mule Deer are considered both a regionally and provincially significant species and are specifically provided for with special management in the CCLUP Higher Level Plan. In the CCLUP, one of the stated objectives for mule deer is to maintain winter ranges in a condition to support the regional mule deer population of 25,000 deer through critical winter conditions. Although some population trend inventories have been conducted in recent years, there are still considerable knowledge gaps for some areas and populations. The objective of this project is to gain information to assist in determining if the regional population objectives are being met under management practices as described in the CCLUP, Regional Mule Deer Winter Strategy and CCLUP integration report, as well as the detailed winter range management plans.

Describe Tasks, Deliverables, Targets and Milestones:
This project has two components:

- winter population census on one to two winter ranges. Aerial surveys to be completed from December to January.
- Spring surveys to monitor population trends, both aerial and ground counting during April.
- Deliverables include technical reporting describing methods and results and a mapping component.

Cost Sharing: NA

Partnerships:
To be implemented by MWLAP in partnership with MSRM.

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	60,000	50,000	50,000	0	0	160,000	3

SSFM Issue #13	Lake Classification	RMP-02-56

Summary:
Under the Forest Practices Code (FPC), the class of every lake, situated within an area where timber management is planned, must be identified in the operational plans for the area. This process has been developed to ensure that special values of lakes and lakeshores – including fisheries, water quality, wildlife habitat and biodiversity, and recreational and visual quality – can be protected.
A key component of the Lakes Classification process is the analysis and integration of fish and fish habitat data. Information on the lakes' capability to produce fish, the fish and fish habitat data and recreational use will be provided by MSRM and WLAP to the Lakes Classification committees.

Status: Existing

Objectives:
Auxiliary staff will be hired to work with the Lake Classification Committee. Information from MSRM and WLAP files and databases will be analyzed and entered on to standard forms. These data forms will be integrated into Lake Classification processes in all Forest Districts involved in the process.

Describe Tasks, Deliverables, Targets and Milestones:
Data related to lake capability, fish species present and their characteristics, lake and lakeshore habitat parameters, angling guide information and fishery values will be provided to Classification Committees at monthly or semi-annual meetings. MSRM and WLAP databases will be updated with new information by March 31, 2003.

Cost Sharing: N/A

Partnerships: Forest Companies, WLAP, MSRM, MOF

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
100,000	3	56,000	56,000	0	0	0	112,000	5

SSFM Issue # 1a	Incorporate the Impacts of Insects and Diseases into Ecosystem Management Planning	RMP-02-57

Summary:
This project is linked to SSFM Issue "Biodiversity/Risk Management/Mountain Pine Beetle".

The IFPA area has historically been subject to infestations of insects and diseases. The traditional approach has been to develop forest management plans that do not account for this activity, to analyse and project the impact of these plans on management plans, and to amend those plans as needed to accommodate or mitigate those impacts. This approach often results in significant disruptions to management plans and reductions in both timber supply and habitat quality.

Lignum believes that this approach must be replaced with recognition that insects and diseases are natural change agents and an integral component of natural disturbance patterns. Lignum will develop an innovative approach to insect and disease management that fully incorporates the potential effects of these agents into ecosystem management planning and forest management regimes.

Methodology is applicable throughout the Cariboo Forest Region. While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #9.1

Objectives:
- Determine role of Insects and Diseases in natural disturbance patterns.
- Provide supporting data for ecosystem management planning.
- Determine innovative method to incorporate insects and diseases into ecosystem management planning.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
Start project in September 2000; Project completion by December 2001.

- Initial Planning Meeting
- In conjunction with Workplan 5.5, evaluate the historic roles of insects and diseases.
- Review historic and current outbreak incidence data.
- Design computer simulation scenarios to investigate relationships.
- Run simulations, analyse and interpret results.
- Investigate methods to reduce risk to these changes, short and long term.
- Develop initial management strategies.
- Develop forest management policies and protocols based on initial management strategies.
- Produce final report
- Review with Region
- Region Approval
- Project Completion

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years 2001/02	$$ 2002-03	$$ 2003-04	$$	$$	$$	$$ Total	
$5,000.	1	$20,000	$30,000	$	$	$	$55,000	3

SSFM Issue # 1a	IFPA Mountain Pine Beetle Management Plan	RMP-02-58

Summary:
This project is linked to SSFM Issue "Biodiversity/Landscape Level/Risk Management/Mountain Pine Beetle".

The Cariboo Forest Region, including the IFPA area, is currently experiencing a significant mountain pine beetle epidemic. Workplan 9.1 is designed to minimise the impact of this kind of catastrophic event on the management plans for the IFPA. In the interim, there is a need to provide immediate analysis of the potential spread of pine beetle within the IFPA, and to incorporate that information into strategies so that operational activities are less likely to compromise future management options.

SELES is being developed to analyse the dynamics and potential spread of MPB within the eastern portion of the Williams Lake Forest District (east of the Fraser River) and the southwest portion of the Horsefly Forest District (Moffat Creek). The results will be used to better control MPB.

Methodology is applicable throughout the Cariboo Forest Region.

Status: Existing Lignum IFPA Activity #9.2

Objectives:
- Determine innovative method for strategic management of Mountain Pine Beetle.
- Dialogue/Co-ordinate activities with Cariboo Region Pine Beetle Strategy Committee and other associated groups.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
Project started in July 2000, and then updated annually.

- Initial Planning Meeting/MoF Interaction
- Dialogue/Co-ordinate activities with Regional Strategy Committee and other associated interests.
- Review outbreak incidence data.
- Design corresponding simulation scenarios.
- Run simulations.
- Analyse and interpret results.
- Initial results.
- Annually update strategies.

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years 2001/02	$$ 2002-03	$$ 2003-04	$$	$$	$$	$$ Total	
$30,000.	1	60,000.	10,000.	$	$	$	100,000	3

SSFM Issue # 1a	Landscape Level Planning	RMP-02-59

Summary:
This project is linked to SSFM Issue "Integration/Operational Plans/LUPs"

Computer modelling at a strategic level will be performed to determine if initial projected results (Technical support documents) are reasonable and attainable over long periods of time. For the past two years, Lignum has undertaken a strategic and landscape level modelling exercise for the IFPA area. The Forestry Plan framework required rigorous testing of specific issues to understand implications. Two modern computerised forest modelling tools, OPTIONS and ATLAS, were initially employed to predict the outcome of forest management interventions on habitat over a 200-year time horizon. New models will be evaluated and selected as appropriate in order to address regional issues.

Existing forest development planning as well as hypothetical scheduling of harvest chance patches for both the short and long term will be tested. These harvest patterns will be combined with a GIS analysis of constraints, to evaluate the characteristics of patch sizes and the spatial arrangement, distribution of wildlife tree patches and riparian management areas, and seral stages. Key components of this evaluation will form the basis for landscape unit monitoring.

Results from landscape level planning are expected to provide background for specific rationales justifying harvest patch sizes and distribution. Results will also support the development of spatially explicit landscape unit plans throughout the Cariboo Forest Region.

Landscape level plans will allow the implementation of harvest and silvicultural systems designed to reduce the loss of productivity associated with permanent access structures. Plans may increase timber availability by not "isolating" timber.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base and will include work on significant regional issues such as MDWR management, timber enhancement initiatives, and MPB management.

Status: Existing Lignum IFPA Activity #5.7

Objectives:

- To model the spatial feasibility of a given harvest level using a recognised computer model.
- To provide rationales to support approval of forest development plans consistent with the Forest Practices Code and the Forestry Plan objectives.
- To illustrate spatial interactions between IFPA and TSA portions of landscape units.
- To demonstrate successful use of NDT pattern harvesting and habitat distribution over time.
- To utilise stand structure attributes and patch size distribution to spatially deliver landscape objectives.
- To confirm direction and policy developed as result of strategic level modelling.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:

Start project in June 2000, project completion by December 2002.

Landscape Level Planning. Date (Actual Target)

- Workshop
- Define Areas building on work completed in the Technical support documents Jan./01
- Prepare Database
  - Collect background information
  - Determine the current status of the planning area
  - Map known features of existing protected areas
  - Determine the desired patch size distribution
- On-going Interaction with Regional/District Planning staff et al.
- Confirm Targets with Model
  - Compare CCLUP seral stage targets with model output
  - Determine the amount of mature/old seral stage required to meet biodiversity needs.
- Plan Development
- Evaluate/Refine
  - Model valuations

  CCLUP Targets
- Produce interim report on findings, including TSA-wide discussions. Spring 2002.
- Application of Pilot Methods to Other Landscapes 2002/03.
- Prepare Database
  - Collect background information
  - Determine the current status of the planning area
- Map known features of existing protected areas
- Model desired DLU target levels
- Report

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
70,000	1	150,000	0	0	0	0	220,000	2

SSFM Issue # 9	Timber Enhancement Area Pilot	RMP-02-60

Summary:

This project is linked to SSFM Issue "Timber/Enhancement/Timber Access/Definition".

From the mandate presented in the 90-Day Implementation Process Final Report of February 1995, Lignum believes there exists an opportunity to establish Timber Enhancement Areas focused primarily on timber production. Lignum envisions the establishment of a number of pilot areas within the IFPA area that will be primarily focused on timber production. The Land Use Plan delineated 40% of the Region as the Enhanced Resource Development Zone, where the Land Use Plan challenged the forest industry and government to "set achievable, performance-based targets for increased sustainable productivity in this zone through intensive reforestation, spacing, pruning, thinning and new harvest practices." The 90-Day Implementation Process Final Report requires that a target be set over time for the proportion of forest land base available for enhancing timber productivity. In that portion, measures will be taken to increase long-term timber growth and value and to increase short-term timber availability.

Initial work is underway to formulate recommendations for developing an IFPA timber enhancement pilot based on guidance in the Land Use Plan.

The pilot is applicable throughout the Cariboo Forest Region.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #8.8

Objectives:

- Demonstrate expected increased volume available through implementation of innovative forest management activities.
- To promote the use of silviculture treatments that enhance the productivity of stands within the Timber Enhancement Areas.
- Provide supporting data for ecosystem management planning.
- Provide localised inventory data for benchmarking purposes.
- Provide statistically valid data on past growth trends leading to a realistic base case scenario.
- Present a case for increased AAC on the IFPA area.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
Start project in June 2000; Project implementation completed by October 2003.

- Initial Planning Meeting/MoF Interaction
- Review selection criteria and candidate pilot areas.
- Select Pilot area(s).
- Design
- Consultation
- Final Design
- Field Work
- Conduct Analysis
- Produce final report
- Review with Region
- Region Approval

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
15,000	1	25,000.	25,000.	25,000.	0	0	75,000.	4

SSFM Issue # 8	Landing and Road Rehabilitation Operational Trial	RMP-02-61

Summary:
This project is linked to SSFM Issue "Timber/TSR/Productive Land Base/Current Management".

One objective of the Forestry Plan is to conduct incremental silviculture activities in a manner to increase the base case that would lead to an increase in the Allowable Annual Cut (AAC). One of the objectives of the *Forest Practices Code of British Columbia Act* is the protection or conservation of forest productivity (Lawrie et al., 1996). With this in mind Lignum developed a Landing Rehabilitation Operational Trial that explored options in recovering areas designated as non-productive. The trial commenced in 1996 and was completed in 1999. A total of 667 landings were recovered, amounting to 200 hectares. Many of the landings were severely compacted; initial indications are that productivity of the rehabilitated landings will approximate 60% of original productivity. This is consistent with Weyerhaeuser's Tree Farm Management Plan submitted in 1995. Weyerhaeuser (Kamloops Forest District) chose this rate assuming that an entire landing may not achieve 100% productivity.

Investigating landing rehabilitation treatments within the IFPA area will provide more specific knowledge on successful rehabilitation techniques. Lignum has implemented an intensive monitoring program that will investigate tree and vegetative growth responses, silviculture and cattle interactions, and soil bulk densities. Results of this monitoring program will assist Cariboo licensees.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #6.8

Objectives:

- To evaluate techniques to restore a commercially viable tree crop on landings (and roads).
- To develop a set of treatment regimes that carries over into Operational Landing Rehabilitation including ones specific to cattle management.
- To evaluate the biological and economic effectiveness of each treatment regime.
- To restore biodiversity on these landings (and roads) with the establishment of native grasses and shrub species.
- To increase the base case.
- To implement monitoring plans (i.e. bulk densities and vegetation assessments).

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
The Landing (and Road) Rehabilitation project has been conducted since 1997 under an operational trial system. Monitoring will be continued on an ongoing manner. Landings will be scheduled for treatment throughout the term of the IFPA. An initial operational trial is complete. Year 2 of monitoring remains to be completed. Results will be widely distributed.

Cost Sharing: NA

Partnerships: NA

Investment to Date		Investment Required						Total Years to Complete
$$	Years 2001/02	$$ 2002/03	$$ 2003/04	$$	$$	$$	$$ Total	
35,000.	1	35,000.	35,000.	0	0	0	70,000.	2

SSFM Issue # 6	Pilot Management Units in Fir	RMP-02-62

Summary:
This project is linked to SSFM Issue "Mule Deer Winter Range/Future State/Objectives".

Participation in MDWR planning will provide opportunities for cross linkages to be developed between agency initiatives and the modelling and habitat planning proposed by Lignum. Lignum believes that habitat inventory necessary to develop winter range plans within the IFPA has already been gathered under a combination of Vegetation Resource Inventory and the Terrestrial Ecosystem Mapping (TEM) programs. Over time, Lignum will pursue alternative approaches to management for mule deer winter ranges.

Lignum believes an approach that uses stand structure goals, including basal area, and maintains stands around an average basal area. Allows more harvest flexibility while still maintaining habitat value over the longer term. High and moderate crown closure stands can be managed to maintain old characteristics that address mule deer habitat needs. This approach is expected to allow harvesting in MDWR while maintaining required habitat components for over-wintering deer. Lignum intends that the development of this approach proceed in concert with overall research into dry-belt Douglas-fir management. Methodology is expected to be applicable in MDWR throughout the Cariboo Forest Region.

While initially limited to Lignum's IFPA area, methodology developed will be applicable to the larger regional land base.

Status: Existing Lignum IFPA Activity #5.8

Objectives:
- Provide objectives and details as input to habitat management plans.
- Develop linkages and support for ecosystem management.
- Demonstrate potential for increased volume growth from IFPA area stands.

Describe Tasks, Deliverables, Targets, Drivers & Milestones:
Project started in October 2000; Anticipated project completion by December 2005.

- Planning Session/Status Review
- Determine methods for developing interaction between Ministry and Lignum staff.
- Develop linkages between MDWR planning and ecosystem management planning.
- Analyse stand structure attributes.
- Incorporate stand structure attributes into stand modelling.
- Determine sensitivity of forest level outcomes projected by MDWR output comparison to ecosystem management planning.
- Establish desired spatial and temporal distribution of required habitat types.
- Determine potential for increased availability of timber resources.
- Regional approval

Cost Sharing: No

Partnerships: No

Investment to Date		Investment Required						Total Years to Complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	30,000.	40,000.	0	0	0	70,000.	2

SSFM Issue # 1a	SBS-ESSF Old Growth Attributes	RMP-02-64

Summary:
The "old" and "mature" seral stage definitions are currently based on age as determined from the forest inventory. Age is used as a proxy for the forest attributes that are generally believed to be associated with old and mature forests. Age alone is not a reliable predictor of old growth status, as forest development is related to factors such as disturbance patterns, site index and mortality. More exact definitions of old growth for specific forest types will lead to better and more informed management decisions that affect landscape level biodiversity.

Status: New

Objectives:
To refine the definitions of old and mature forests in the SBS and ESSF BEC zones so that landscape level biodiversity can be more accurately represented.

Describe Tasks, Deliverables, Targets and Milestones:

- Examine FIP and TEM databases for features that are or may be indicators of old/mature forests (e.g. disturbance agents, snags, vertical structure, stem distribution, diameters, insect/disease codes, related vegetation types). (Spring 2002)
- Prepare GIS-derived maps indicating the areas with relevant database features. (Spring 2002)
- Field sample to verify the presence and extent of the features identified in the databases. (Summer 2002)
- Prepare a summary report of findings. (Winter 2002)

Cost Sharing: None.

Partnerships: None

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	120,000	0	0	0	0	120,000	1

SSFM Issue # 8	Monitoring MPB Infested Stands	RMP-02-65

Summary:
This project is linked to:

- Predictive Modelling of Mountain Pine Beetle Outbreaks at the Strategic Level Using CFS/SELES Model (Lig 9.2)
- TESC Optimising Model
- VRI MPB Infestation Monitoring Proposal
- Seral Contribution of MPB and PFT Proposal

Using an ecological and hazard risk strata based sample design to develop a matrix of past attack occurrence in relation to a probability matrix for predictive behaviour. Develop and quantify matrix based recommendations as to projected merchantability and silvicultural regimes. Destructive sampling techniques may be employed in conjunction with net volume adjustment factoring and/or call grading.

Probable continuation over two or more years. Program and results will be evaluated for continuation at the end of year one.

Status: New project

Objectives:
Through study and correlation of data from previously attacked stands, to document and understand the factors affecting rate of timber volume/value decline and pace of regeneration following successful attack by the MPB. Provide quantified level of data for inclusion as "current management" for TSR 3. Determine impact and opportunities, via concurrent optimisation project (TESC 2.1.4), in relation to sustainable harvest levels. Provide an indication for operational level planning functions as to expected merchantability recovery. It is expected that operational level recommendations will reduce the cost of planning, development, harvest and reforestation of attacked sites.

Describe Tasks, Deliverables, Targets and Milestones:

- Phase 1: Completion of a detailed Project Plan.
- Phase 2: Preparation of a Sample Plan including identifying the population to be sampled, determining sampling methodology, establishing sampling intensity and indicating the attributes to be measured. Data collection procedures, collection card design and creation of an electronic database format are also required. Field crew skill requirements must be set.
- Phase 3: Field data training, collection and quality assurance.
- Phase 4: Data entry comprising key-punching of data from collection cards to the digital spatial database - including quality control for accuracy, compilation of raw field data and preparation of basic data summaries.
- Phase 5: Data analysis and reporting
- Phase 6: Final Reporting and Recommendations including ensuring availability to forest planners.

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$50,000	$250,000	0	0	0	30,000	2

SSFM Issue # 3	Northern Caribou 80/20 Lichen Operations Decisions	RMP-02-66

Summary:
This project is linked to:

- Modified Harvest Valuation Discussion Paper
- SP Pilot/Study for Modified Harvest Areas
- Short Term Timber Access

The CCLUP and Integration Report directs that approximately 80% of the modified harvest area for northern caribou is to be managed with harvesting prescriptions designed to maintain terrestrial lichens (50% area retention) and the remaining 20% of the modified harvest area is to be managed to retain arboreal lichens (66% area retention). Currently there is no process or methodology in place to geographically locate where the different lichen retention levels will be applied or where the lichens actually exist. From the landscape and operational planning perspectives, it would be advantageous to determine where these lichens currently exist or where the proposed retention levels will be applied. If we could predict their locations, then planning would be more efficient, and more ecologically based harvesting and silviculture prescriptions could be developed.

Status: New project.

Objectives:

- Develop an understanding of where the different types of lichen grow.
- Determine broad areas where arboreal lichens and terrestrial lichens predominate.
- Develop a range of options to assess lichen growing areas at a landscape level, and on specific sites such as areas proposed for harvest under forest development plans.

Describe Tasks, Deliverables, Targets and Milestones:

- Current available information will be reviewed, including terrestrial ecosystem maps.
- Literature will be reviewed, and discussions will be held with government agency and industry personnel.
- Expected time period is up to two years, beginning in April 2002. Work in the first year is expected to determine the scope of the project and to develop a working plan for the subsequent year's activities.

Cost Sharing: None

Partnerships: None

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$10,000	$40,000	0	0	0	50,000	2

SSFM Issue # 2	Mountain Caribou Population Dynamics	RMP-02-67

Summary:

This project is linked to:

- Caribou/Moose/Wolf population Dynamics

This project is linked to caribou juvenile survival rates are important indicators of the overall population status. Small caribou populations in areas where wolves are sustained at relatively high numbers by moose are subject to high rates of predation by wolves. The segments of the caribou population that are most vulnerable to predation are juveniles (from birth until they reach one year of age) with the most significant period of juvenile mortality is from birth to the fall rutting period in October.

Mountain caribou in the eastern portion of the Cariboo Forest Region are currently at very low population levels, are at risk of extirpation and are red listed provincially. To manage this population responsibly, tangible measures to indicate the success or failure of ongoing management actions are required as quickly as is possible. The best measure of success in a single year and then with multi-year trends is the rate of survival of juvenile caribou.

Status: New project

Objectives:

- Determine the level of knowledge of juvenile survivorship for mountain caribou.
- Develop a program to monitor juvenile survival rates.

Describe Tasks, Deliverables, Targets and Milestones:

- Current available information will be reviewed, including data from government population surveys, and methods used in them.
- Techniques cited in the literature will be reviewed, and discussions will be held with government agency personnel.
- Recommendations for a program to monitor juvenile survival rates will be developed.
- Expected time period is up to one year, beginning in April 2002.

Cost Sharing: None

Partnerships: None

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	10,000	0	0	0	0	10,000	1

SSFM Issue #3	Caribou/Moose/Wolf Population Dynamics Study	RMP-02-68

Summary:
This project is linked to:

- Caribou Population Dynamics

Moose populations are capable of sustaining wolves at relatively high numbers. In a predator prey system that includes moose, caribou and wolves, with increased wolf densities, wolves are capable of driving the caribou population to much lower numbers. A healthy moose population can support larger wolf numbers while caribou numbers decline. It has been demonstrated that smaller caribou populations are kept at very low densities in the presence of moose and wolves. It is clear from available literature and local inventories, and research that abundant alternate prey (moose), and the resulting higher wolf densities have reduced the caribou populations. The current mountain caribou population levels in the east portion of the Cariboo Forest Region are very low as a result, and are at risk of extirpation. A much greater understanding of the dynamics of this multi-species system is needed, so managers can develop and implement effective strategies to reverse the decline of caribou, and increase the population to more resilient levels.

Status: New project.

Objectives:

- Develop an understanding of how and where caribou are adversely affected by high moose numbers.
- Determine the information required to support positive management action to increase mountain caribou populations.
- Devise a management program that has the best chance of increasing caribou populations to safer levels.

Describe Tasks, Deliverables, Targets and Milestones:

- Review current available information, data and literature to promote a greater understanding of this multi-species system, and its implications locally.
- Review and assess existing moose and wolf management programs and activities.
- Using the information gathered and analysed, identify gaps in current programs, and recommend activities to fill those gaps. A report will be developed that includes recommended options for further inventory, research and management action.
- Expected time period is one year, beginning in April 2002.

Cost Sharing: None

Partnerships: None

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	25,000	0	0	0	0	25,000	1

SSFM Issue # 6	Activity: MDWR OGMA Prescription	RMP-02-69

Summary:

This project is linked to:

- MDWR Management Plans
- SP Pilot/Study for Modified Harvest Areas
- JS/CT Study
- Timber Access Pilot study
- Monitoring Stand Level Forest Management on MDWR

The MDWR management plan template proposes a wide range of treatments in order to achieve the various wildlife, biodiversity and timber objectives. The Integration report directs that in the long term there should be 66% of the yield of conventional selection harvesting practices from moderate and high crown closure classes and old seral areas within MDWR's. In order to achieve these challenging resource requirements within MDWR's, the MDWR committee proposes a wide range of harvest opportunity types, one of these harvest opportunity types is a proposal to achieve a 20-25% relative yield from old seral areas. We can assume that this highly modified and challenging prescription will take considerable study at the conceptual level, and ten analysis in order to determine the ability to accomplish this prescription in order to meet biodiversity, wildlife and timber objectives.

The proposed funds will be used to support a suitable person (licensee, agency, consultant, academic, etc) to co-ordinate and facilitate a small but dynamic group of individuals representing licensee/agency staff that operate in these areas from throughout the region. This group would be under the guidance of and existing agency/industry sponsored body (THDC, Implementation Committee, SDM's, etc).

Status: New project

Objectives:

- interpret the proposed contribution of the old seral areas relative to the overall timber access targets within MDWR's in order to establish the 'order of magnitude' of the overall contribution of these specific areas
- through discussion with the MDWR committee and analysis using the growth and yield assumptions made to date, propose models and then variations of how to achieve these expected contributions for discussion purposes
- test these proposed variations in terms of what can be reasonably done in the field
- make recommendations as to how to achieve the intended results

Describe Tasks, Deliverables, Targets and Milestones:

- two year timeline in order to provide adequate time for various groups and committees to engage in the process
- create a small working group of industry and agency participants to lead the process (completed within 3 months)
- interpret and summarise direction provided to date, and then build a contact and task list (completed within 6 months)
- interpret and summarise G&Y direction and assumptions (completed within 12 months)
- interpret and summarise prescription direction and assumptions (completed within 18 months)
- documenting assumptions, propose variations of achievable prescriptions and make recommendations on how to achieve desired and intended results (completed within 24 months)

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	$15,000	$15,000	0	0	0	30,000	2

SSFM Issue # 6	Barriers (Biological) to High/ Moderate Crown Closure Capability Habitat	RMP-02-70

Summary:

This project is linked to:

- Short Term Timber Access
- MDWR Management Plans
- Merchantability Pilot/Study
- Monitoring Stand Level Forest Management on MDWR
- Achieve Timber Access Targets in MDWR

The MDWR management plan template requires that long term 'habitat capability' be determined, provides a relatively simple process to do so, and then uses the derived information to determine management direction and eventually stand level prescriptions. There are many opportunities to include additional information that may improve upon the estimate of high/moderate crown closure capability.

There are several aspects of the approach provided in the template that can potentially be further improved. They are:
the information that is used to determine the limitations to high crown closure
the use of information to determine forest site capability or productivity.

The first opportunity would address the incorporation of additional information (soil maps, VRI, local area knowledge, etc) in order further refine the high/moderate definition in terms of capability. In this case the decision is based on a barrier to achieving the desired crown closure capability and is focused on MDWR management.

The second opportunity would address the incorporation of forest site productivity information in order to, where appropriate, choose between assigning different areas to high or moderate crown closure given more than one choice. In this case the choice is neutral to MDWR and is focused on making the best choice for timber productivity reasons.

The assessment of each of these potential areas of improvement is the intent of this project.

Status: New project

Objectives:

- determine how to use new, local or otherwise information within the current process
- determine how to make the best choices for timber production within the current process (neutral to MDWR needs)
- document both of these opportunities for use by forest planning practitioners

Describe Tasks, Deliverables, Targets and Milestones:
Similar to the MDWR OGMA prescription project, we would propose to:

- have a two year timeline in order to provide adequate time for various groups and committees to engage in the process
- create a small working group of industry and agency participants to lead the process (completed within 3 months)
- interpret and summarise information and direction provided to date (completed within 6 months)
- interpret and summarise additional information sources for constraint measurements or the first opportunity for improvement (completed within 9 months)
- interpret and summarise additional information sources for forest site productivity or the second opportunity (completed within 12 months)
- combine the two opportunities in order to develop the best possible combination of constraint measurement and where appropriate site productivity decision making (completed within 15 months)
- documenting assumptions, propose variations and make recommendations of how to achieve optimal results (completed within 18 months)

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	15,000	15,000	0	0	0	30,000	2

SSFM Issue # 6	MDWR Timber Access Target Pilot/Study	RMP-02-71

Summary:
This project is linked to:

- Short Term Timber Access
- MDWR OGMA Prescription
- MDWR Management Plans
- Monitoring Stand Level Forest Management on MDWR

The MDWR management plan template proposes a wide range of treatments in order to achieve the various wildlife, biodiversity and timber objectives. The Integration report directs that in the long term there should be 66% of the yield of conventional selection harvesting practices from moderate and high crown closure classes and old seral areas. The MDWR committee proposes a wide range of harvest opportunity types, including forest health (fir bark beetle), non-fir volume variations, thinning from below and selection harvesting. The 'relative' contribution from each of these harvest opportunity types is proposed based on growth and yield assumptions (relative yields from each crown closure class and old seral).

In its current form, the template intends to achieve wildlife and timber objectives, however there are many unknowns regarding achieving the level of timber access in both the long and short term.

Status: New project

Objectives:

- using existing capabilities, assess MDWR template direction in order to determine if the long term timber access targets can be achieved
- if required to do so, develop new capabilities in order to determine if the long term and/or the short term timber access targets can be achieved as per the MDWR template direction
- identify issues that require additional activity in order to assure the intended results are achieved

Describe Tasks, Deliverables, Targets and Milestones:

- one year timeline in order to provide adequate time for various groups and committees to engage in the process
- create a small working group of industry and agency participants to lead the process (completed with 1 month)
- interpret and summarise direction provided to date, and then build a contact and task list (completed within 3 months)
- interpret and summarise address G&Y direction and assumptions (completed within 5 months)
- interpret and summarise template direction and assumptions (completed within 7 months)
- model and analyse direction and assumptions from both the long term and short term perspectives (completed within 10 months)
- summarise efforts and results, propose future tasks as needed (completed within 12 months)

Cost Sharing: none

Partnerships: none

Investment to date		Investment Required						Total Years to complete
$$	Years	$$ 2002/03	$$ 2003/04	$$ 2004/05	$$ 2005/06	$$ 2006/07	$$ Total	
0	0	30,000	0	0	0	0	30,000	1